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Technology as an extension of the human body
Exploring the potential role of technology in an elderly home care setting
Anna Essén
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Abstract

The present thesis explores the potential role and implications of technology in elderly care from the users’ perspective. This exploration is undertaken in terms of five empirical studies of a telehealth project and a meta-analysis of their contributions. An important insight emerging from this work is the need to rethink the human subject as a body, rather than as a mere mind using technology. The thesis draws on phenomenology to re-conceptualize the user of technology, and on this basis, to theorize about the potential role and implications of technology in care. It concludes that, in combination with humans that integrate technology with their other sensory and emotional capacities, technology can produce affect. The findings indicate that technology can contribute to senior citizens feeling safe, cared for and thereby less isolated. The findings further demonstrate that, because of the perceptual capacity gained from technology, the care workers become aware of new health problems that urgently call for their sensory and emotional responsiveness. On this ground, the thesis challenges the determinist view that technology threatens the essentially ‘human’ aspect; rather, it concludes that feeling and other bodily resources are fundamental in the use of technology. Indeed, technology activates such ‘human’ capabilities.

Hence, technology plays a role as a complement for rather than as a replacement of care workers. It increases their work burden by informing them about new needs. This may improve care quality but at an increased cost, which is relevant from a practical perspective. At a more general level, the thesis challenges the dualist legacies in mainstream management research that have sought to divorce mind from body, nature from culture and reason from emotion. It can therefore contribute to broader theoretical developments and fuel existing debates beyond the care setting.

Keywords: care, telehealth, information technology, physicality, materiality, Merleau-Ponty, body, emotion, routines, variability, surveillance, privacy, service evaluation, service innovation, emergence, learning.
To Korris
This thesis would have looked completely different had I written it alone. Dear reader, you should have seen the first drafts of each paper! They asked different questions, used other theories and reached conclusions far from those outlined here. The papers were overall much longer. I realized—rather late—that research is not a matter of providing detailed and objective accounts of “the state of affairs” of things. To perform research is rather to participate in an academic debate by providing an argument that supports or contradicts others’ arguments. It is all about claiming something, and to do this in a convincing and trustworthy way. Being a researcher implies making decisions about what—of so many things that one reads and observes—to include, and about which conclusion—among numerous possible ones—to draw. This thesis is the result of various such subjective decisions about what to leave out and thereby hide. Dear reader, please keep this in mind. Yet, also recognize that the present thesis is not only the result of one person’s (my) subjective decisions. While never objective, it is the result of the choices made by numerous peer researchers, including many anonymous reviewers.

In general, I believe that this thesis represents a pragmatic effort. The papers make this explicit, including not the most “true” theories but rather the most “useful” ones: useful as they elucidate something that other theories do not. And, I have to admit, useful in the sense that they helped me to position my research and suited the interests of some Journal Editors (who considered the theories “timely” and “relevant”).

Hence, the thesis should be seen as a pragmatic but serious attempt, made by a collection of scholars, to provide insights about how we can think about technology, care and human relationships and thus contribute to theory and society. I would like to thank some of you who have helped me during the process of writing this thesis. The names are not ordered according to your importance.

My supervisors have done a remarkable job:

Solveig, you made the studies in this thesis happen by initiating and arranging the telehealth project in Heby as a sub-part of the TIDE program. Your visions and professionalism are gratefully appreciated. Yet, you’ve

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1 For more information about the research program Tangible/Intangible Dynamics in the Digital Economy (TIDE), see http://www.fek.su.se/home/sw/
done more. Despite your great knowledge and experience, you are extremely humble and generous with compliments. Thank you for inspiring me—when I have needed it the most (your timing has been amazing!). Thank you equally for always providing a critical eye towards eloquent but pretentious and useless theorizing. Thank you for asking: OK, so what does that fancy concept really mean? Does it make a significant contribution?

Ali: You’ve taught me more about academic research than anyone else. Thank you for having the courage and energy to criticize my texts. Thank you for expecting much of me: for telling me, this is not good enough! Your belief in high quality science is unusual but contagious. You have such high ideals. Don’t abandon them.

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And those of you involved in the empirical telehealth projects: all you care takers +65 years: I will never forget your way of letting me into your homes, sharing your views with me and teaching me a lot beyond this thesis. Thank you also Bo and Birgitta at Heby community for enabling me to study technology in the elderly care setting in the first place. Your decision to invest in a new technology was brave! Special thanks to Eva, Siv, Carina and all the other group leaders and home-helpers that I have interviewed and observed. Thank you Fredrik Björklund from Alleato, for sharing with us your technology expertise!

The publication policy in the academic world has made me disappointed and disillusioned in the sense that it is being driven by quantity rather than quality and that this often plays too large a role in what gets done. But academics have also impressed me. Thank you my colleagues/friends at Stockholm University: Sara, Daniel, Torkild, Clara, Johanna, Robert, Eva & Dick for supporting me and for being devoted researchers. Your genuine interest in contributing to society or to theory has inspired me. Thank you my colleagues/friends at Harvard: Jeremy N, David S and Juergen B for letting me in your community, truly wishing to exchange healthcare research experiences. You showed me how exciting but tough research life can be.

This thesis would not have been written at all if it weren’t for my sister and my parents. To Linda, my dear sister who encouraged me to become a doctoral candidate: You have always seen me as far more intelligent than I actually am – which has only made me stronger! And Apricot & Pippi: A 30-old-year feeling that ‘something’s missing’ after 2 days of work without mom and dad in the background – is that normal? Well, Yes. With you as parents it is. There is no room for me to thank you here. Suffice it to say that you are my best friends and you are fantastic role models. I could not have done this without you.

I also want to thank my old friends, Åsa Ö, Linda U, Pernilla, Åsa A and Sofia for being patient with me during these years! Åsa Ö: thank you espe-
cially for sharing your impressive knowledge about and experience of elderly care with me!

Finally, *this thesis might have been written: but I would have been a freak* had you not been by my side, Christian. Writing a PhD can make one fascinated by new theories that say absolutely no more—only with different words—than what most people already know. Thank you for reducing that tendency in me. And thank you for telling me: “How beautiful you are” when I have actually looked like a wreck in my dirty sweatpants, bad breath and mouth-full-of-half-eaten-cookies, sitting in front of the computer hour after hour…day after day…

Getting married to you is the most emotional and best thing that has ever happened to me!
PART ONE: META-ANALYSIS
Long-term elderly care constitutes a particular kind of service. Intimacy, relationship building and “humaneness” are frequently referred to as key elements of such care services and the practice of nursing has historically been based on the assumption that direct human interaction has a strong therapeutic effect (Ford & McCormack, 2000; Glen, 1998; Gunter & Alligood, 2002; May & Ellis, 2001; Strauss et al., 1982). Introducing technology-mediated, remote services is bound to problematize such conventional assumptions.

Certainly, the idea of computerized care is a controversial issue, especially in the context of elderly long-term care, where it has generated a polarized debate between advocates and critics of information technology (IT). Many scholars, practitioners and politicians have anticipated how IT-based home care services could enhance care quality and ultimately lead to an increased quality of life for the caretaker. It is also asserted that IT – a low cost resource – could replace humans in performing certain tasks and thus enhance the effectiveness of care (Bashshur et al., 2005; Committee on Quality of Health Care, 2001; Demiris, 2004; Herbert et al., 2006; Korhonen et al., 2003; Teknisk Framsyn, 1999; SOU, 2002). Adversaries, on the other hand, express concern about how technology may impose an instrumental rationality on care work that would serve the interests of managers rather than care personnel and elderly caretakers. They envision the possibility of IT-based care services replacing proximal care services, arguing that this could lead to the elderly becoming isolated from social structures and ultimately to a mechanization and dehumanization of care (Bauer, 2002; Dewsbury et al., 2002; Dunn, 2000; Dutta-Bergman, 2003; Hagberg, 2003; Stanberry, 2000; Williams et al., 1998; Taylor, 2001). Although there are far-reaching visions as well as fears attached to the introduction of IT-based care services in both public and scholarly circles, it is yet largely unknown what could be the role of new technology and what implications it could actually generate in the elderly care setting. A major reason for this uncertainty is the narrow focus characterizing the academic discourse on IT and care.

A large share of the current literature aims to investigate the ‘effects’ of IT in care. The outcome measures used, however, are limited to medical and clinical parameters, such as blood sugar values and number of hospital re-admissions (Bashshur et al., 2005; Hailey et al., 2002; 2004a; 2004b; Heinzelmann et al., 2005; Roine et al., 2001). It is further difficult to interpret the
often conflicting results reported as most studies omit to explicate the role the technology is assigned in the study setting, implicitly attributing the reported results to the technology itself. Several studies have suggested that “contextual” factors beyond the specific technology in focus influence the implications of IT in care (Ash & Berg, 2003; Kaplan & Shaw, 2002; Mohd et al., 2007; Schabetsberger et al., 2006). However, by focusing almost exclusively on how “managerial issues” often lead to the make or break of IT implementations, this body of research, too, escapes some of the most basic and critical issues in the IT and care debate.

The idea of using new technology in care raises classical philosophical questions about the role and implications of technology in human life more generally (cf. Sharff & Dusek, 2003) — questions that have not been treated sufficiently in the literature. I am referring to matters such as: Should we understand technology as antithetical to the emotionality and intimacy of human relationships? Is technology a force that leads to a mechanical execution of services and to a standardized human interaction? In short, will technology dehumanize care?

Addressing these “thorny” issues requires an exploration of how humans (caretakers and caregivers) engage with new technology in everyday situations. It seems reasonable to argue that care consumers and care workers’ experience of new technology is a fundamental question to investigate in order to advance the IT and care debate. Their views determine how the technology is used, what role the technology is assigned and hence the consequences of the technology. However, as indicated above, little attention has been paid to such fundamental topics in academic research about IT and care. As a result, unfounded scenarios have gained a strong foothold in the debate and in practice. Negative predictions have been particularly influential in the elderly care setting. Skepticism towards technology is widespread among care providers and the diffusion of technology in elderly care is slow (Essén, 2003). Many view technology as a threat to ‘genuine’ care giving work, whereas, in fact, no one has studied if this is the case.

Against this background, the present thesis explores the potential role and implications of new technology in care service production and consumption. As opposed to the contemporary research on IT and care, the thesis acknowledges and brings to the fore the contextual, concrete and non-mechanical aspects of care, articulating the physicality and emotionality of care. From this standpoint, the thesis poses the following question: How can technology contribute in this setting?

The thesis consists of two parts. Part two includes five studies that are based on two cases from the elderly care sector in Sweden where an in-home health monitoring system is used. Each study deals with a separate sub-question, uses a unique theoretical framework and provides stand-alone theoretical contributions. Part one, on the other hand, provides a meta-analysis and synthesis of the common themes emerging from the five studies.
at a more general level.\textsuperscript{2} Using a phenomenological approach (primarily Merleau-Ponty, 1962), this overarching analysis departs from the studied care workers and caretakers’ experience of technology. It assumes that the locus of this experience is the human body with its sensory and emotional intelligence, a body that is closely intertwined with the existing local setting and prevailing culture. What emerges from this overarching analysis is a new way of conceptualizing technology as an extension of the human body, including its material and ideational dimensions. The proposed way of theorizing about humans’ engagement with technology has several implications. First, it helps us to think in new ways about the potential role of technology in care from a user’s perspective, and second, about how technology can generate value in a setting such as care. In this way—\textit{by opening up perspectives rather than coming to a closure}—the thesis contributes to the contemporary understanding of the potential role of new technology not only in care but also in organizational life more generally.

Part one includes a critical review of the dominant frameworks used in the “IT in care” literature, a presentation of the alternative framework used in the overarching analysis, conclusions, major implications and suggestions for further research. The five studies are presented in part two.

\textsuperscript{2} Note that the five studies include several important themes relating to care, technology, organization, innovation, learning and work that the overall introduction does not cover.
Highlighting weaknesses in dominant approaches to human-technology relationships

In this section I briefly give an account of the extant literature about IT and care services. The meta-analysis of the five studies in this thesis made me aware of the limitations in this body of research. While acknowledging its accomplishments, I shall argue that it often builds on assumptions that neglect important aspects of people’s engagement with technology. As noted in the end of this section, this weakness can be traced back to a narrow-minded view of the human subject in social science research at the general level.

Research ignoring the human context - seeking the effects of technology itself (determinism)

Research on IT in care is mostly undertaken in computer science, informatics and medical disciplines and published in advanced engineering, tele-health, health informatics and e-health journals. Most studies are technology or medically oriented and deal with either (1) describing prototype development and demonstrating technical possibilities or (2) evaluating the clinical effects of new telehealth technologies. A large part of the latter category of IT and care research is rooted in health economic theory, seeking to compare the outcomes of IT-based care services with the outcomes of a previous non-technological alternative. The results have been found to vary. Whereas some studies conclude that telehealth can produce improved intermediate health outcomes and reduce hospital readmissions, other studies report negative results (e.g., Bashshur et al., 2005; Chan et al., 1998; Heinzelman et al., 2005; Hersh et al., 2002; Louis et al., 2003; Mair & Whitten, 2000).

Although this literature is informative regarding the functional properties of technology, it is less so concerning how these functions are used. Reviews of “telehealth” exclusively include studies employing health economic methods (randomized controlled trials) that focus on inputs (technological artifacts) and outputs (quantified clinical outcomes) while black-boxing the process of using technology. Reviews often exclude evaluations that focus on, e.g., user, organizational or other context-specific issues (see, e.g., Roine
et al., 2001; Hailey et al., 2002; 2004a; 2004b; Taylor, 1998). This tendency stems from the ambition to produce decontextualized, objective and generalizable results. Paradoxically, the result is often the opposite.

Although there is eagerness among healthcare researchers to evaluate exactly to what extent IT is ‘The Answer’ to contemporary healthcare problems, their conclusions do not provide an answer to this question. An important reason for this is that authors neglect implications in areas beyond the strictly medical (patients’ physiological values) or clinical (hospital readmissions). The quantitative measures that are used say little about how care consumers or care workers experience the new technologies in their everyday life. In general, studies focusing on the objective functionality of technology and its quantitative effects provide little theoretical input to discussions on how technology will make patients feel when being provided with “IT-based care services”, about how care workers will use technology in their everyday work or about how we can understand the role of technology in relation to human labor, i.e. how humans engage with technology and how this affects their involvement with each other and the world.

An explanation for the neglect of these issues is that studies adopting health economic models tend to view technology as given and attribute observed consequences to the technology itself, i.e. they implicitly provide a deterministic view of technology (cf. Collingridge 1980, Latour, 1992). A deterministic view also underlies the polarized positions in the popular debate and in practice (see introduction) in predictions suggesting that technology in itself will lead to certain effects.

Technological determinism is the view that technology is an autonomous force that constitutes a fundamental cause of change in society (Sharff & Dusek, 2003). This view essentially suggests that technology, once created and put in place, takes on a life of its own, follows a line of development almost contextless and therefore inevitably produces certain results. Discussing technology and society at the general level, optimistic technological determinists have celebrated technology for its modernizing features, viewing technology as a revolutionary solution to social and economic problems (cf. Castells, 1996; Sharff & Dusek, 2003; Toffler, 1981). Pessimistic determinists, on the other hand, have argued that modern technology (in general) threatens “the natural” and essentially human condition (Ellul, 1964; Heidegger, 1927/1962; Jonas, 1979; Marcuse, 1964/2003). This occurs because it takes over previous biological, perceptual and creative functions of human beings, producing a discontinuous and fragmented perception. Thus, in the end it displaces human labor power in favor of automated technological production (Kellner 1999; Virilio 1994; 1995; 1997; 1999). Obviously, these philosophical utopian and dystopian views have reappeared in the care debate, in the visions concerning how IT itself represents a “technological fix” to the quality problems of care and in the argument that technology in itself will lead to a dehumanization and mechanization of care (see introduction).
In summary, a large part of the IT and care literature and public debate is implicitly based on technological determinism. This is a problem. As noted by numerous authors, it is irrelevant to study or even discuss the effects of IT applications themselves (Bijker et al., 1987; Feenberg 1992/2003; Kellner, 1999; Scharff & Dusek, 2003). Such an approach neglects the possibility of human users to make choices as regards how to use the technology. Moreover, as demonstrated in the studies here, such choices significantly shape the consequences of technology. I will return to this point later.

Viewing humans and technology as social facts (constructivism)

As a response and alternative to the deterministic view of technology, a view of technology as something socially constructed emerged in social studies of science in the 1980s. This body of research suggests that what technologies are and become depend on the continuous reshaping of the technology by its users (e.g., Bijker et al., 1987; Bijker & Law, 1992). Similar perspectives have recently appeared in IT and care research. A growing number of studies depart from an interpretive and qualitative approach, studying the use of telehealth in specific settings. These studies show that a variety of healthcare information systems are little used, even though their technological accuracy have been demonstrated. It is argued that these results are due to organizational conflicts and other context-specific reasons, rather than the technology itself (e.g. Berg, 1999; 2001; Forsythe, 2001; Kaplan & Shaw, 2002; May et al., 2003; Mohd et al., 2007; Nicolini, 2006).

The social constructivist influence on IT and care research has brought attention to the fact that technologies cannot be understood independently from how they are used in the actual context. This is an important contribution. However, authors have limited their attention to ‘organizational’ and managerial’ problems at the expense of individual care workers and caretakers’ experience of new technology in their work and everyday life. In general, social constructivism can be criticized for suggesting “there is nothing but the social” (cf. Feenberg, 2003; Ihde, 1990). This is problematic because, as suggested by the studies in this thesis, concrete material aspects (such as the physical attributes of technology and the physical capacities of human users) influence how humans deploy technology, which, in turn, influences its implications.
Equating humans and technology – viewing both as semiotic constructs (technoscience)

It is relevant to mention that theories highlighting that the material dimensions of technology can influence its implications have appeared in the technoscience literature. The actor-network theory (ANT) (Latour, 1987) suggests that technology and humans do not occupy separate domains or operate according to separate logics, nor does their relationship develop in some unilinear way (the former ‘causing change’ in the latter or vice versa). Work practices consist of various human and non-human elements and what comes to be the application and impact of technology is emergent, determined by the unpredictable interplay of these elements in each situation. It is argued that humans and non-humans should not be viewed as discrete entities: they constitute a sociotechnical assembly that should be dealt with as a whole (Latour, 1987; 1993). Haraway, (1991: 149, 152) writes: “Cyborgs [are] creatures simultaneously animal and machine...” and that the “leaky distinction is between animal-human (organism) and machine.”

These theories of technoscience have only begun to emerge in the IT and care/services research. For example, Nicolini (2007) observed how unexpected changes in care processes follow the introduction of IT in the studied care setting. He argued that the effects are unpredictable and emerge only when human and technological actants interact in situ. Thus, Nicolini concluded that studies need to explore unexpected effects and refrain from focusing ex-ante on some specific phenomenon (cf. Berg 1999; 2001; Constantinides & Baret, 2006).

Technoscience theory has contributed to IT and care research by underlining the unpredictable aspects of technology use. However, while attempting to bring forth ‘the material’ in addition to the social, physical aspects of the human body (such as emotion) are left out in this literature. In fact, technoscience research tends to portray humans and nonhumans as rather abstract ‘actants’, between which there is a symmetrical interaction. Latour takes the strongest stance, suggesting an interchangeability of humans and nonhumans. He writes that in sociotechnical collectives: “…there is no plausible sense in which artifacts, corporate body, and subject can be distinguished” (Latour, 1993: 197). This position is close to the hybrid-cyborg figures of Haraway (1991). Both theories seek to blur the boundaries between subjects, artifacts and society, based upon semiotic principles. They describe human and nonhuman actors as textual constructs, operating on equal terms, merely according to different codes or ‘programs’.

My observations certainly inspired me to criticize this view of “the world-as-text.” It obscures crucial ontological differences between humans and machines by producing non-situated and disembodied accounts of humans’ engagement with technology, as well as of organizational and social life in general. The studies included in this thesis demonstrate that the world in-
cludes more dimensions than those that can be expressed in ‘programs’ or language. And, is the world nothing but emergent? Are there not relatively stable structures – history – that influence human action and experience? I am not alone in raising these questions (e.g., Ihde, 2002; Scharff, 2006). As others have argued, humans and artifacts can be made equivalent semiotically, but in practice they are not (Pickering, 1995). Humans are bodily, emotional and moral beings that are situated in a historical time in a way that technology in itself is not (Ihde, 2002). This crucial difference should not be ignored in IT and care research.

The need for alternative approaches

In summary, the extant IT and care services literature provides different views of technology and its users. Some studies implicitly draw on technological determinism and tend to ignore aspects related to human users completely; other studies provide a social constructivist view and can be criticized for reducing humans and technology to social facts. A limited number of studies use the ANT to acknowledge the mutual influence of the social and material. However, they do not discriminate between technology and humans, viewing them merely as abstract, semiotic constructs. This seems counterintuitive, especially in the long-term elderly care setting. As noted above, the importance of emotional sensitivity, intimacy and physical touch is well established in the care service setting literature. This was also clear to me in my effort to synthesize the findings of the studies included here. I repeatedly returned to the users’ perceptual capacity and emotionality when trying to understand the role of the technology in the cases studied. These issues seemed to hold as much explanatory power as the technology itself. Hence, the need for approaches that would help me take into account non-discursive, concrete, “human” aspects in the study of technology became obvious to me. Finding such a theoretical platform, however, was easier said than done.

In truth, not only the IT and care services literature but also the organizational, management and sociological literature at the more general level provides a limited treatment of the human body and its emotions. Organization and management research has traditionally focused on human agents as rational decision-making agents, viewing rationality as a calculative, analytic and non-emotional capacity residing in the human mind (e.g., Simon, 1976). Implicitly or explicitly, emotions have been dismissed as irrational, inner sensations and desires needing to be ‘tamed’, harnessed or driven out by the steady hand of reason (Brandth et al., 2005; Knights & Thanem, 2005; Nussbaum, 2001; Williams & Bendelow, 1998: 25); the body has been treated as a non-intelligent and rather uninteresting physical container (Dale, 2001; Thanem, 2004; Turner, 1991; 1992; 1996; Shilling, 1993; 1997a,
1997b; 1997c). Although in recent decades there has been a resurgence of interest in bodily matters in the social sciences, theorizing is still limited and one-sided. In relation to technology, investigators have primarily focused on the physicality of the body as constraining, discussing how technology may conquer such limitations, freeing subjects from their bodies (e.g., Balsamo, 1995; Featherstone & Burrows, 1995; Waldby, 1997; Williams, 1997, cf. Dale, 2001). In general, most studies discuss how social forces shape the construction of the body and thus emphasize the view of the body as passive, as an object of control and as acted upon\(^3\) (Dale, 2001; Shilling, 1993; 1997a; 1997b; 1997c). Research on the body has further been disconnected from research regarding emotions and vice versa; the limited research that does exist about emotions tends to view emotions as mental rather than bodily\(^4\) (Knights & Thanem, 2005; Williams & Bendelow, 1998). This situation within social science research reflects the powerful legacy of the mind/body dualism of, e.g., Cartesian philosophy. Scholars’ eagerness to turn away from biological determinism is most likely another reason for the prioritization of the ‘social’ and ‘mental’ at the expense of the physical (Knights & Thanem, 2005; Shilling, 1993; 1997; Turner, 1992).

Given the state of the contemporary literature, I concluded that neither the “IT and care” literature nor the mainstream social science literature could be helpful in framing the findings in my five studies. These findings do not highlight human ‘minds’ experiencing and reacting to technology based on fact-based, calculative evaluation procedures. Rather, they point at active human bodies, with enabling physical capacities, using technology. Emotions further play various positive roles in the users’ experiences in ways that I could not categorize as purely mental or irrational. Consequently, I could only agree with those scholars who criticize contemporary literature for neglecting that (1) the body should not only be viewed as acted upon but also as an active and enabling force and (2) emotions are part of human physicality, expressivity and intelligence (Damasio, 1994; Hassard et al., 2000; Knights & Thanem, 2005; Nussbaum, 2001).

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\(^3\) The prevalence of accounts of “docile bodies as faceless objects” (McNay, 2000) in the organizational literature is often explained by the influence of Foucault. However, as noted by Crossley (1996), Foucault views the body as both active and acted upon. However, he tends to be weaker on seeing the active body and he does not provide a coherent theory of embodied agency (McNay, 2000), which may have led to the focus on the inscribed body rather than the lived body in Foucauldian organizational literature (Crossley, 1996).

\(^4\) This research has largely built on Hoschild’s (1983) notion of emotional labor. Although providing significant insights, Hoschild’s theorizing on emotions does not emphasize bodily, physical aspects (Knights & Thanem, 2005). It also runs into problems of micro and macro linkages (Williams & Bendelow, 1998; Wouters, 1989). I will return to this point later.
Suggesting a phenomenological approach

Looking for an alternative philosophical underpinning that would help explicate the insights emerging from the studies included here, I turned to the phenomenological literature. I found that Merleau-Ponty’s (1962, 1965, 1968) work provides a fruitful platform for highlighting the physical and emotional aspects of human experience, without returning to biological determinism.

Introducing the work of Merleau-Ponty

Phenomenology is the study of human experience from the first-person point of view. That is, phenomenology is interested in how humans perceive the world and its objects rather than in whether the objects ontologically exist in any objective sense. Merleau-Ponty entered the phenomenological field in the 1950s, introducing the notion of the body-subject as the source of human experience. Other phenomenologists had prepared the ground for this view. Husserl (1970[1936]) emphasized that “the life-world”, i.e. humans’ subjective perception of the world is the basis of their existence. Heidegger (1962[1927]) also emphasized the everyday experience in the world, talking about how “being-in-the-world” is what makes humans know things about the world (Yakhlef, 2008). Although Merleau-Ponty (1962; 1965; 1968) extended these ideas, he also diverged from them. Merleau-Ponty criticized Husserl’s understanding of human perception and experience as conscious acts occurring in the mind, viewing instead human experience as involving the whole body – in action, and intertwined with the world. In general, Mer-

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5 Phenomenology includes several sub-branches (e.g., Embree et al., 1997).

6 Husserl understood human experience as constituted by a transcendental, inner, meaning-giving realm. Husserl sought to lay bare the essential structure of this deeper realm of subjectivity and consciousness. The author was uninterested in any reality beyond the lifeworld, “bracketing” the question of the independent existence of the natural world around us. Heidegger argued that we should not study our activities by “bracketing” the world, but rather look to our contextual relations to things in the world. Heidegger resisted Husserl’s Cartesian emphasis on consciousness, suggesting instead that our ways of relating to things are in practical activities, in a context of equipment and in being with others. Merleau-Ponty extended these ideas, claiming that the human subject is not a transcendental subject but a subject that emerges from nature. Hence, as noted by Bernet (1993), in Husserl’s work there is a reduction of natural life, whereas in Merleau-Ponty’s work there is a reduction to natural life.
leau-Ponty saw the central phenomenological task as one of re-establishing the roots of the mind in its body and in its world (Merleau-Ponty, 1965). In these terms Merleau-Ponty challenged classic phenomenology, where that which thinks is separate from the material world and the body and where our experience is directed toward things only through concepts and ideas (Dreyfus, 1979; Ihde, 1993; Merleau-Ponty, 1962; Stanford Encyclopedia, 2004; Williams & Bendelow, 1998).

This perspective helped me to rethink and thus to better understand the experience of the studied care workers and caretakers. My intention is to present the re-conceptualization of “the user” of technology that emerged as a result of a parallel re-reading of the five studies and a gradual understanding of Merleau-Ponty’s philosophy.

Rethinking the user of technology

Uniting mind and the physical body

I saw human bodies rather than mere ‘minds’ experiencing technology (and other objects/events) when analyzing the five studies in this thesis (Study 1, *The role of emotion in service evaluation: senior citizens’ assessment of long-term care services*; Study 2, *Variability as a source of stability: studying routines in the elderly home care setting*; Study 3, *The emergence of technology-based service systems: a case study of a telehealth project in Sweden*; Study 4, *The two facets of electronic care surveillance: exploring the elderly caretaker’s view* and Study 5, *The corporeality of learning in everyday practice*). The care workers and caretakers further evaluated the technology not only based on fact-based, calculative processes but also using their bodily emotions. By reading Merleau-Ponty’s claim that “human subjectivity is a bodily subjectivity” and that “the body is who we are; it is our consciousness, intelligence and intentionality”, it struck me that what these findings pointed at was simply that *the user is a body*.

Merleau-Ponty further underlined the primordial intention of the human body to be in equilibrium in the world. He saw this as a pre-reflective intentionality, bound to and realized only in the bodily performance itself (Vas-sleu, 1998). From my view, Merleau-Ponty is talking about a bodily intelligence that helps us to act ‘smoothly’ in the world. This kind of bodily tendency was quite obvious in the experience of the care workers studied here. Their basic, pre-reflective intention to acclimatize to their local and cultural environment clearly influenced their use and evaluation of the technology. (e.g., Studies 3, 5).

The care workers and caretakers investigated in this thesis did not only engage with the technology in sub-conscious, non-discursive ways. As the
interview transcripts reveal, the studied users also reflected on how to use the technology and about its actual and potential contributions (Studies 3, 4). Similarly, Merleau-Ponty did not deny the “reflective”, mental, rational or discursive aspects of human life. What he did want to suggest was that such aspects are inseparable from our bodily, physical nature. He argued that discourse is far from a disembodied process: it is a fleshy process; it is produced though the work of the body. In short, there is no choice between discourse and fleshiness, according to Merleau-Ponty’s theory. They belong to each other “as do legs and walking.”

This seemed to me a fruitful view as I could not clearly separate the studied users’ conscious and sub-conscious, brain-related and body-related, fact-based and emotion-related perception of the technology. Rather, they seemed intertwined and equally important. Hence, the present conceptualization of “the user of technology” draws on Merleau-Ponty to suggest that the body is neither solely a discursive object (as suggested in pure constructivist views) nor solely flesh and bone (the naturalistic view). The body rather provides a physical basis for all its discursive processes. In short, the ideational and the material are entwined. This notion of intertwining also concerns the relationship between subject and object or between the perceiver and the perceived.

Connecting the active body to the world

Merleau-Ponty argued that perception is not a matter of our body passively receiving sensory data form the world, data that our mind later on interprets in isolation. Rather, perception should be understood as our body actively but pre-reflectively interrogating the world. Perception is about our body interpreting the world in relation to our practical engagement in the world, i.e. the projects we are involved in.

My findings support Merleau-Ponty’s rejection of the idea that perception is an ‘inner’ representation of an ‘outer’ world of given objects (Merleau-Ponty 1962; 1968). The care workers and caretakers in the present thesis clearly perceived the technology (and other objects/events in the world) in relation to their concrete day-to-day interests (Studies 1-5).

They further perceived the technology from somewhere. Merleau-Ponty argued that our perception is contingent on our bodily position and tangible

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7 Despite Merleau-Ponty’s emphasis on our ‘primordial union with the world’, he made it clear that one never returns to immediate experience. Reason has a role in our ways of living, but it is based on the phenomenological exigencies of the subject and their life-world.

8 Merleau-Ponty argued that perception is not merely the result of the functioning of individual organs but also a subjective human act in which each of the senses informs the others in virtue of their common behavioral project. As noted by Barral (1965: 94), Merleau-Ponty’s theory suggests that “if we attempt to localize and sectionize the various activities which manifest themselves at the bodily level, we lose the signification of the action itself.”
presence in a specific physical situation (Mallin, 1979). He also underlined that our perception is situated in a historical situation and is influenced by social, economic, political and cultural forces. This does not mean that Merleau-Ponty advocated a view of human bodies as passive or as mere social constructs. According to my interpretation, his theory opens up for a view where our bodies incorporate the micro and macro structures in which they are situated, an incorporation that is selective, influenced by the physicality of the body itself. In general, Merleau-Ponty’s theory emphasizes the lived, active body-subject rather than the body as an inert matter that is acted upon (Dale, 2001; Grosz, 1994; Williams & Bendelow, 1998). This view is consistent with the present findings. For example, I would not describe the care workers’ bodies as mere recipients of social structures. Sure, they incorporated values in society but they did this selectively, thereby selectively reproducing—renewing—structures. Accordingly, the present conceptualization builds on the premise that the human body is not only shaped by but also agentic and active in relation to prevailing structures (e.g., Studies 3, 4).

The conceptualization of the user suggested here further assumes that this mutual influence also applies to the human body and objects in the local, physical setting. Merleau-Ponty provides an example of a patient that experiences an absent limb (hand) as a correlate of those aspects of the world that ‘speak to’ the hand (e.g., the piano to be played) or the doorknob to be opened. When the patient restructures her/his world in such a manner that the things no longer beckon to the lost limb, then the experiences of the limb vanish. To me, this example illustrates how our experience of ourselves (our ideational and material subjectivity) is influenced by the objects in our surroundings, and how we perceive objects on the basis of our own, enabling and constraining, physicality. As Merleau-Ponty made clear, "whenever I try to understand myself, the whole fabric of the perceptible world comes too (Merleau-Ponty, 1964:15). He insisted, "man is a network of relations" (1962: 456) and maintained that these relations are not something that we can unravel. The interdependence of the network is what gives humanity its very qualities: by dissecting it, we risk losing the very thing that establishes us as human.

**Linking emotion, body and rationality**

In Merleau-Ponty’s theory the mutual encroachment of the subject and the world and the ideational and material also explain human emotion. Merleau-Ponty refused to describe emotions as private and purely ‘mental’. Accord-

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9 As indicated by Schmidt (1983), Merleau-Ponty’s view may have inspired Giddens later structuration theory (1979; 1984), which recognizes that social structures produce but are also selectively re-produced (and thereby potentially renewed) by individual agents.
According to his philosophy, emotions are essentially communicative and intersubjective, constituted as physical and cultural dispositions through techniques of the body (Crossley, 1995a; 1995b; Williams & Bendelow, 1998). As noted in the Stanford Encyclopedia (2004), the view of emotions as physical (residing in the individual’s body) as well as cultural implies a certain ambiguity at the heart of our experience. Trying to discern what an authentic emotion of the self is, which is not induced by the demands of one's society, is infinitely difficult. Merleau-Ponty refused to use the concept of authenticity for his entire career “because of its overtones of an unattainable individualism” (Stanford Encyclopedia, 2004). He would not want to say that coming to terms with one’s own situation in an empowering way is impossible; rather, he feels that we cannot transcend our environment. Merleau-Ponty's suggestion is that “circumstances point us to, and that they allow us to find a way” (Merleau-Ponty, 1962:456; Stanford Encyclopedia, 2004).

Overall, Merleau-Ponty’s view of emotion is far from a ready-applicable package. Nonetheless, in combination with other, newer emotion theories (Crossley, 1997; Damasio, 1994; Nussbaum, 2001), his philosophy helped me to articulate what my studies pointed at, namely that emotions are bodily communicative capacities that help us to behave effectively and reach our goals (Studies 1-5).

The present conceptualization assumes that, as with all our bodily knowledge, emotions are shaped (enabled and constrained) by the physicality of the body as well as by culture. Put differently, emotions are ideational and material and they include pre-reflective as well reflective dimensions.

Re-conceptualizing the relationship between humans and technology

The present studies did not point at care workers and caretakers focusing on technology. They rather exhibited users engaging with each other through technology. Merleau-Ponty similarly argued that we often perceive the environment through intermediary objects without being explicitly aware of these objects. For example, he referred to the blind person who is accustomed to using a stick and senses where he is "through his stick". The blind man is not aware of the stick but the objects he attempts to navigate about: it is actually the other objects that make him aware of the stick. Further, we “know” how to turn a corner with our bike almost as if the bike was our own body. We think from the point of view of the bike. Thus, Merleau-Ponty’s theory suggests that we can incorporate instruments into our own body schema. This knowledge is not necessarily reflective or discursive; rather, it is practical, embodied know-how and mastery (Crossley, 1995a; 1995b; 1996). This argument can be traced back to Heidegger’s (1927/1962) “ready-to-hand”: 
for example, the hammer functioning as an extension of the arm’s capabilities (Selinger, 2006).

Ihde (1990) develops the idea of humans reaching the world through technology. He maintains that the intentionality of bodily action goes beyond one’s bodily limits, reasoning that technologies must be understood as existing in relation to humans rather than as discrete objects (Idhe, 1993). Ihde provides a useful conceptualization of human technology relationships in this context. He writes about embodiment relations, where we humans take technological artifacts into their experiencing. In embodiment relations technologies constitute and approximate the status of a ‘quasi me’, as, e.g., eyeglasses, and we perceive the world through technology. The technology withdraws to such a degree that it becomes the means and not the object of our perception. This is obviously similar to Merleau-Ponty’s discussion of the blind man’s cane serving as an extension of his perception. In hermeneutic relations the artifact is not transparent but provides a representation of the world. In such relations readable, interpretable technologies make the world accessible to us in ways impossible for naked perception. In such relations the perceptual focus is on the text of the artifact. Finally, alterity relations refer to relations in which humans focus attention upon the technology itself and perceive the technology as quasi “other” to which we relate, as e.g., in playing video games (Ihde, 1990).

I will use this conceptualization to analyze the studied care workers and caretakers’ engagement with technology in the next section. Suffice it here to say that in embodiment and hermeneutic relations, technology can be understood as an extension of the human body and perception. This implies that the technology can expand the human body’s ability to perceive affordances, i.e. opportunities for action. It is difficult to determine whether this extended perception resides inside the human body or if it is external, residing in the technological ‘object’. This issue resonates with Merleau-Ponty’s problematization of the separation of the subject/object. Against this background, the present conceptualization does not attempt to draw a strict border between the human user and the technology used (between the ideational and material). Instead, it assumes that there is a continuous relationship between these two.

Methodological reflection

Drawing on the phenomenological approach described above, the present thesis departs from the human subjective experience when analyzing the potential role and implications of technology in care. It assumes that the situated human body (with its reflective and pre-reflective capacities) is the locus of this experience. This view has specific methodological implications. It suggests that the researcher needs to study not only that which can be ex-
pressed in words but also non-discursive aspects. The thesis is based on empirical material generated by observations, in-depth interviews and field work (see further the method section in the studies and Appendix 2). Although this field work provided access to non-discursive elements, it is difficult to provide a portrayal of emotional, pre-reflective and tacit aspects of human action in the format of an academic thesis, i.e. with text (cf. Knights & Thanem, 2005). This thesis, however, should be understood as an attempt to bring such aspects to the fore.

The thesis discusses the human body, on the one hand, and technology as something “perceived,” on the other. This may appear contradictory to Merleau-Ponty’s phenomenology, which resists any strict border between subject and object, inside and outside, perceiver and perceived. However, as noted by Merleau-Ponty himself, it may be useful in a particular situation to conceive of a seer and a seen, a subject and an object - provided that the terms of such dualities are recognized as relationally constituted. 10

In the spirit of phenomenology I further want to highlight how my own body and its situatedness have influenced the present work. This thesis is written from the perspective of an eager-to-publish Ms Sc in computer science. With a passion for elderly care and with an essentially positive attitude to technology, I am not claiming that the cases I have studied have presented themselves to me in any absolute manner from all their various angles. My observations and the findings presented in the present studies are not the result of my eyes and ears ‘neutrally’ and passively receiving sensory data and my mind later interpreting these events. My observations have rather been linked to my situated ambitions, to find something publishable inter alia. Encouraged by trends in the academic literature (primarily in management and organization science) and the theoretical interests of peers at my institution, my body has selectively perceived certain events and not others in both pre-conscious and conscious ways.

The physicality of my body has shaped the writing of the present text, which is not the result of a merely calculative, fact-based reasoning in my mind. The text is also shaped by pre-reflective and emotional, i.e. bodily aspects. In some ways such aspects may have led me in arbitrary directions. The fact that certain “complicated” theories have made me feel excited (rather than them being more useful or ‘true’ than other theories) has most likely led me to use them rather than other alternative theories. My use of certain theories rather than others may also be related to me being well rested, sitting in a comfortable chair, satisfied food-wise (hunger tends to

10 Merleau-Ponty did not want to deny the possibility of cognitive relations between subject and object. In his theory the seer and the seen condition one another. Our capacity for seeing is different from the capacity for being seen.
make me more critical) when reading these theories, and in an opposite physical condition when reading other potential theories.

Overall, I feel that my body, including its emotions, has constituted an important resource in my work, leading me towards relevant paths. I have seldom had a clear formulation in my head before writing a paper. Rather, my intention has been to “write my way to” an idea or conclusion. In fact, I could not have asked someone else to “write down my thoughts” as most of my conclusions have been forthcoming through the bodily effort of writing. In a sense my hands have drawn conclusions as much as my brain. As regards emotions, I agree with Jaggar’s view that emotion is necessary in order to produce reliable knowledge (1989). For instance, my efforts to not only draw publishable, but also “fair” conclusions and to provide “honest” accounts of the methods used are not the result of any calculative fact-based reasoning. My emotions rather forced me to this path— I would feel uneasy and guilty if I had not. I do not attempt to determine to what extent these enabling and constraining emotions and moral convictions are “my own” or constructed by society. Suffice it to say that these bodily forces have exerted a concrete (I have felt them) influence on this work in a way that I refuse to call irrational.
The potential role and implications of technology in elderly care – the user perspective

The re-conceptualization of the user outlined above makes it possible to view the encounter between individuals and technology in a new way (compare with the deterministic, constructivist and technoscience approaches in section two). Assuming that ‘the user is a body’ with all that it implies, this section begins to tentatively conceptualize the potential role and implications of technology in care based on themes that emerge from the five studies in this thesis.

Viewing technology in use as an extension of the human body

The studies in this thesis suggest that humans use technology if they feel that it provides them with relevant capacities. Given that this is the case, they think of and use the new ‘extended’ or ‘technology-mediated’ capacity just as any of their other ‘naked’ bodily capacities. In other words, they incorporate the technology into their own body.

For example, Study 4 highlights that one of the seniors studied did not perceive that the technology expanded her bodily capacities, but rather the opposite. She perceived the technology as an opponent rather than a component of her own body. She engaged in an alterity relation (Ihde, 1990), experiencing the monitoring technology as some foreign and intruding “other”, constraining her possibility of action. As a result, she rejected the technology (interrupted the service). Her reaction can be understood as an illustration of how the human body rejects technology if it feels that the technology creates tensions (deviations from some ‘optimal’ body-environment relation) rather than facilitates a smooth functioning in the world (Merleau-Ponty, 1962), just as a human would reject an organ implant if it created conflicts with other organs. The example further illustrates how the emotion of the body can be constraining, impeding certain uses and hence preventing certain implications.
The majority of the caretakers studied, however, *embodied* (Ihde, 1990) the technology deployed. The technology itself is not the object of these seniors’ attention: the technology becomes transparent and withdraws. From the seniors’ perspective, the technology is merely a means *through* which information about their health status is delivered to the care workers. Just as musicians can produce new sounds and make themselves heard through a music instrument, the seniors perceive that, through technology, they can make themselves ‘heard’ and ‘seen’ in expanded ways. As a result, the technology makes the seniors feel safe. What makes the seniors feel safe, however, is their belief that they, through the technology, can be ‘seen’ by other human caregivers (i.e. by other familiar individuals) (cf. Study 4). The senior caretakers, therefore, do not view the technology as an isolated, external object, but they perceive the technology as an extension of their own human body and the human bodies of others.

The care workers used the system studied differently from the seniors. They looked at “activity curves” on a computer screen. Studies 2 and 5 illustrate that the care workers perceive that each activity curve refers to a senior’s activity status in her/his home. Hence, the care workers engage in a *hermeneutic* relation (Ihde, 1990) with the technology; the screen data become their object of perception while simultaneously referring beyond itself. The seniors’ behavior and activity status become present to the care workers *through* the technology (digital activity curves) (cf. Studies 2, 3). That is, the care workers gradually started thinking from the point of view of the technology, and, rather than thinking *about* the technology, they started to perceive their environment in a different way (Crossley, 1995a; 1995b).

The care workers’ use of the technology makes obvious their integration of technology-generated capabilities and their ‘naked’ capabilities. Inspired by Merleau-Ponty, I interpret this event as an illustration of the human bodily motivation to avoid tensions with the environment. The care workers avoid such tensions by compensating for the limitations of the technology-mediated capability in various pre-reflective and reflective ways, just as they would compensate for a bad eye with their other eye.\(^\text{11}\) This point is discussed in more detail below.

**Bodies emotionalizing and contextualizing technology**

Taken together, the present studies indicate that while the technology amplifies the care workers awareness of the variability in (one aspect) the seniors’ condition, the technology cannot advice the care workers about how to act on the information (Studies 2, 3, 5). The technology alone has no experience

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\(^\text{11}\) This compensatory capability underlines the argument that technology should be viewed as an extension of, and not a replacement for (or equal to) the human body. It also illustrates how the physicality of the body can be enabling, making implications happen.
of individual seniors’ preferences concerning care delivery and it cannot anticipate how individual seniors will react to different measures. Moreover, the technology cannot relate the problems it detects to other problems in the actual context. These limitations could potentially create tensions. However, the care workers prevent this by using their ‘naked’ bodily capability in several pre-reflective and reflective ways. In a sense it is somewhat off the subject to speak of the de-contextualized and narrow-minded operation of the technology itself, as this is not what the care workers incorporate or use. The care workers cannot but integrate the capability of the technology with their other perceptual and responsive bodily capabilities and emotions (Studies 2, 3, 5). Therefore, in the hands of the care workers, the technology becomes ‘contextualized’ and ‘emotionalized’.

For example, the care workers use their bodily knowledge stemming from long-term relationships with seniors when deciding how to approach individual seniors based on the new information. This enables the care workers to act on the technology-generated affordances in a way adjusted to the seniors and the situation. The care workers also relate the needs detected by the technology to other competing needs and aims in each situation. In the setting studied it is often necessary to partly address several needs, rather than to completely solve one problem and ignore others. Aims are not ordered in any clear pre-defined hierarchy but instead form a heterarchy of aims (cf. Waerness, 1984). For example, neither the ambition to spend time on seniors in need nor the objective to maintain fairness can be completely ignored in a situation. As revealed in studies 2, 3, 5, the care workers use their body (its pre-reflective as well as reflective capability) in order to cope with such situations. Their emotion-ethical values represent particularly important resources (a kind of knowledge) to them when they need to compromise between competing needs.

Another theme running through studies 2, 3, 5 is that the technology extends the care workers’ perception in a very delimited area when considering their overall day-to-day work. To avoid tensions the care workers need to detect and respond to variability in many areas beyond the seniors’ activity level. Studies 2, 3, 5 show that the care workers’ ‘naked’ sensory and emotional bodily perceptions help them in this context. The way in which their body receives and responds to calls from the environment allows the care takers to deal with many problems without them needing to reflect consciously on this is truly extraordinary. It is hard to conceive of a technology performing this activity, which is often pre-reflective and non-discursive.

In general, the present studies illustrate how care workers’ bodies often spontaneously express emotions when interacting with seniors. To understand this, it needs to be noted that care workers are urged to act not only by self-interest but also by emotional compassion for the seniors. That is, affective (and somatic) states serve as an important driving force in their work. This motivates their perception to ‘open up’ to emotional needs among sen-
iors, and to add to the work they perform the element of “emotional expression”, carefully adjusted to the senior in question. Without being paid for this. For example, they touch seniors to show compassion and joke with the seniors simply to make the seniors feel good, although there is no economic incentive for them to perform such acts. (Most of) the care workers care about the seniors and want the seniors to feel good (cf. Study 3). Their perception and bodily response are directed towards this aim. As a result, the boundary of their area of attention is diffuse and certainly negotiable. Inspired by Merleau-Ponty, I do not attempt to determine to what extent these emotions are authentic or genuine. Suffice it to say that they are bodily, physical, pre-reflective, manifested in performance, and represent important resources to the care workers when doing their job. The care workers’ emotions represent to them a kind of intelligence that guides them in their actions and decisions, helping them to behave ‘effectively’, and I dare say, rationally in specific situations.

It is important to note that the care workers saw the technology in relation to these, their own, naked bodily capacities. Without these capabilities and tendencies of the care workers’ body, the new technology-mediated perception would be worth little.\textsuperscript{12}

Thinking of the implications of technology as capacity and feeling inside the body

It should be apparent by now that the users studied here evaluated the technology based on the opportunities of action it afforded them and the emotions it generated inside of them. Further, they used their emotions in various ways when performing this evaluation of the technology.

The influence of emotion is most evident concerning the seniors’ reaction to the technology. As noted above, one of the seniors did not value the new technology (cf. Study 4). This was somewhat unexpected as she was more anxious and frail than the other seniors. Thus, one could, from an ‘objective’

\textsuperscript{12} It may be argued that the incapability of technology to be emotional, embodied and distracted should be highlighted as an advantage. The emotional relationships between care workers and seniors can produce an emotional bias and unfairness, as the workers’ attachment is presumably not evenly distributed across the seniors (see study 3) and that technology could therefore contribute to a more ‘fair’ perception. If viewing technology as a stand-alone actor, one could argue that it is never in a bad mood and it does not dislike anyone. It operates in a reliable and unbiased way. Further, one could argue that humans could not collect the information in the same focused manner as the technology because their bodily capability to work towards several aims simultaneously causes distraction. However, this thesis suggests that although technology may contribute with new data in a non-negotiable, de-contextualized and non-emotional way, this technological capability is ‘emotionalized’ and ‘contextualized’, i.e. related to other problems, as it is used by the care workers. It is consequently only possible to reduce to a limited extent such things as emotional bias.
or ‘fact-based’ point of view, have predicted that she would appreciate being watched more than the others. However, her reaction was not the result of some fact-based, calculative reasoning process, but followed an emotional line of thought; this woman was negative to the technology because it created certain undesirable feelings inside of her. Being electronically monitored made her feel ‘watched’, almost guilty and ‘constrained’. Yet, the vast majority of the senior caretakers valued the technology, perceiving that it somehow contributed to them reaching certain desirable emotional states, namely the feeling of being cared for, safe and thereby free. The seniors also thought about the technology as a service that can help them avoid moving to a nursing home and thus escape significant privacy intrusions. Furthermore, many of the seniors evaluated the technology in an emotional way, based on what they felt that it enabled them to do.

The care workers also appreciated/valued the technology as they felt that it could enhance their capacity to provide care services more attuned to the needs of the seniors (see Studies 2, 3, 5; cf. Essén, 2008; Essén & Conrick, 2007; Essén & Conrick, 2008). Given the care workers’ hermeneutic engagement with the technology, they are provided with new information about the health problems of seniors. The information collected by the technology is information that the seniors cannot give; nor could the care workers collect this information with their mere bodily senses. Hence, to the care workers the technology becomes an extended "area of sensitivity" (Merleau-Ponty, 1962:143). The care workers evaluate the technology in terms of this extended perceptual capability they gain through the technology.

The care workers and caretakers’ engagement with technology problematizes the view of technology as an external object that humans analytically evaluate. As argued by Merleau-Ponty (1962: 90), an object "is an object only insofar as it can be moved away from me.” What do the care workers and caretakers think of when asked to assess the technology? It is not the ‘objective’ attributes of the technology, but rather the extended bodily capability that they experience through the technology. These capabilities and emotional states (which I would not call purely mental or brain-related) can be understood as a part of the user’s body rather than a part of the technology as an external object. On this background, it seems more fruitful to analyze what human bodies, extended by technology, can accomplish than to focus on where the border between humans and technology occur.

Note, however, that I am not advocating a view in which humans and technology are equal ontologically. What I am suggesting is that the encoun-

13 Drawing on Merleau-Ponty, I believe that even if the users would want to, they could not see the technology as simply the sum of its technical functionality, i.e. as color, shape, etc. The whole background apparatus of what technology in general means for them, what the specific technology has been/could be used for and by whom, comes with their perception of it.
Bodies selectively incorporating the micro and macro context

The conceptualization of the user as a situated body encourages a consideration of how the historical context influenced the studied caretakers and care workers’ experience of the technology (Ihde, 2002; Merleau-Ponty, 1962). Study 1 shows that the seniors are aware of the financial constraints in elderly care. Their incorporation of this aspect of the historical context can partly explain why any “new”, additional service makes them feel grateful. Further, the seniors associate technology with improvement, probably because they have previously experienced technological advancements in their life (cf. Essén & Wikström, 2005; Östlund, 1995). Finally, it appears reasonable to assume that the seniors’ desire for privacy, independence and freedom is related to values in contemporary society. Discussing to what extent the seniors, in having these desires, are influenced by others (e.g., children wishing the seniors to be independent) is beyond the scope of this paper. What I want to note here is that social, political and economical structures influence the seniors’ reason-based and emotional experience of the technology and its eventual implications.

It is similarly helpful to take into account that the bodies of the care workers are situated in specific situations (I.e. in a larger service context) and in historical and cultural time (Studies 2, 3, 5). Study 3 shows how pre-existing structures and norms influence how care workers’ bodies make use of the new technology. For example, as care workers incorporated and were attentive to the value attached to privacy, autonomy and pluralism in contemporary society, they restricted their use of technology in both conscious and pre-conscious ways (cf. Essén, 2008; Essén & Conrick, 2007). The deeply rooted view of elderly care as a matter of human contact further contributed to individual care workers’ emotional conviction that technology would never replace face-to-face visits (cf. Studies 2, 3).

In sum, the situatedness of the users’ bodies influences their perception of and physical engagement with technology. There is, however, scope for an agentic body in the view I propose. Users choose to incorporate, enact and consequently reproduce certain structures and not others. For example, whereas the seniors seem to have incorporated the widespread rhetoric about technology’s potential to ‘increase quality, effectiveness and safety, the care workers have not fully embodied the view that technology represents a ‘panacea’ to healthcare problems. The care workers rather appear to have embraced the established argument that the role of technology is very limited...
in care, as face-to-face contact is crucial in this setting. Of course, the users’ selective incorporation of structures is related to their individual experience of specific situations. That is to say, there is an interaction between the influence of forces at the micro and macro levels, which make their total influence unpredictable (cf. study 3).

**Studying the perceived reveals the perceiver**

In summary, an exploration of the technology as perceived by care workers and caretakers reveals much about these humans. For example, the analysis above exposes care workers and caretakers’ naked bodily resources, showing that emotionality and sensory physicality can be enabling and constraining. The analysis suggests that the users’ mind is clearly rooted in their lived body: the way they think about the technology appears closely intertwined with how their body uses the technology, which is closely related to their interests in everyday life. The users further think about the technology in a way that is both emotional and reason-based, and it is often difficult to separate these two. No doubt emotion and reason are closely interconnected, and emotionality seems closer to rationality than to irrationality. The analysis further begins to portray that the care workers and caretakers’ view is linked to their selective incorporation of social structures. This view supports Merleau-Ponty’s argument that a study of the perceived always ends up revealing the subject perceiving. As he wrote, this is the paradoxical condition of all human subjectivity: “we are both a part of the world and coextensive with it, constituting but also constituted” (Merleau-Ponty, 1962: 453).
The present thesis has explored the potential role and implications of technology in care as perceived by its users. An important insight emerging from this work was the need to rethink the human subject as a user of technology. The exploration consistently pointed at how the experience of the studied users was related not only to their mind but also to their whole body. That is, their physical capacity and emotionality influenced their perception and use of technology and thereby the implications it generated.

The human body is rarely mentioned in the contemporary IT and care literature or in information systems research. Studies have rather tried to understand the implications of technology initiatives by investigating the influence of technological functionality and design, managerial issues or social structures and emergent inter-actions at a discursive level (see chapter two). Although providing important insights, current research has not been able to support or reject the dramatic predictions that circulate in the IT and care debate (e.g., how technology may mechanize and dehumanize care or isolate seniors from social structures).

The present thesis submits that the phenomenological tradition can help us to better address these issues. It uses Merleau-Ponty’s (1962; 1968) phenomenology to re-conceptualize the user of technology as a body, and on this basis, theorize about the potential role and implications of technology in care. The thesis concludes that the caretakers and care workers do not experience technology as an external object with ‘absolute’ or ‘objective’ qualities. They rather engage with technology as an extension of their own (physical and ideational) body, evaluating technology in terms of the bodily capacities and emotional states that it creates inside of them. These insights challenge the view of technology as an object external to the human body, with which the human user inter-acts, a view that is implied in one way or another in widespread frameworks of human-technology relationships in the literature (see section two). The findings rather suggest that human-technology relationships involve intra-actions between the ‘naked’ and the technology-mediated perception and capacity of the human body.

Given this perspective, it is irrelevant to discuss whether technology in itself is non-emotional, de-contextualized and inexperienced. In addition, it is not useful to ask whether a technological device can engage in emotional relationships on its own. The gist of the thesis is that when used in existing emotional relationships between humans, technology can contribute to such
relationships. In combination with humans who contextualize the technical possibilities, incorporating the technology and integrating it with their other sensory and emotional capacities, technology can produce affect. The thesis shows how technology can contribute to seniors feeling safe and cared for, feeling closer to the care personnel and thus less isolated. These findings support early studies of telephone technology, showing that technology can enable an experience of “intimacy at a distance” (Rosenmayr & Kockeis, 1963). However, this view is not widespread in the literature.

In general, the thesis provides a counter example to the heretofore influential argument that technology diminishes the role of situation-specific and ‘personal’ aspects of care. In the setting studied here care workers do not start acting in a detached, spiritless, machine-like manner when using technology. Their emotions do not play a lesser role when they start using technology. On the contrary, because of the perceptual capacity gained from technology, the care workers become aware of new situations that urgently call for their sensory and emotional responsiveness. On this ground, the thesis challenges the determinist view that technology threatens the essentially ‘human’ (Ellul, 1994; Heiddegger, 1949[1993]; Virilio, 1994; see discussion in Dewsbury et al., 2001; Dutta-Bergman, 2003; Dunn, 2000; Hagberg, 2003; Stanberry, 2000; Williams et al., 1998). Instead, it concludes that feeling and other bodily resources can be fundamental in the use of technology. Surely, technology can activate such ‘human’ capabilities.

Note that these conclusions do not point at a general, causal relationship between technology and humaneness and emotionality. According to the phenomenological approach, I assume that what a technology does depends on what users see it as and use it for, which is context-dependent. Care occurs in a particular setting where emotions and physicality are central. This thesis suggests that the use of technology does not change this basic reality.

In general, the thesis does not attempt to come to a closure regarding the consequences of technology in care. It does, however, seek to prescribe a view that focuses on feelings in technology research, promoting a conceptualization of the technology-user as a body rather than a mind.
Theoretical implications and future research directions

The present thesis insists that the pre-reflective intentionality and emotionality of the human body (rather than merely the reflective, calculative capacities of the conscious mind) influence how individuals use and evaluate technology and hence its potential implications. This view complements the IT and care literature (and on information systems more generally), where the human body is typically not mentioned at all. This remarkable neglect of the body in the literature can partly be explained by the nature of the dominant frameworks used. Health economic, social constructivist and actor-network models encourage other foci, such as technology itself and social structures (see chapter two). As an alternative, the framework provided in this thesis inspires to theorizing that departs from the individuals’ concrete engagement with the technology at the micro level, asking what technology can do to human physicality and emotionality. The thesis argues that this is in fact one of the most fundamental questions to ask in order to understand the potential role and implications of technology in care in particular and in social life in general.

The majority of the users studied here experienced technology as an extension of their human body. This observation supports Merleau-Ponty’s (1962; 1968) thesis that there is a continuity rather than discontinuity between the materiality (flesh) of human bodies and technology (the flesh of the world). This implies that research should refrain from studying technology in itself (as is commonly done in the IT and care literature) and instead direct attention to how technology can be integrated with the ‘naked’ resources of our body (cf. Ihde, 2002). We need to widen our perspectives and investigate not only how technology can extend our reflective, mental capacity to manipulate symbols but also how technology can extend the pre-reflective physicality and emotionality of the human body.

The insights of this thesis further relate to the general organizational and sociological discourse on new technology in relation to the human body. This discussion has primarily revolved around the potential of new technology to “free” subjects (read: minds) from their constraining, material bodies. Authors often speak of “post-bodied and post-human forms of existence”
(Featherstone and Burrows, 1995: 2; Lupton, 1995; cf. Can der Ploeg 2002; Stone, 1991) and write that when we enter cyberspace we “leave behind our animal-shaped, emotional, intuitive, situated, vulnerable, embodied selves” (Dreyfus, 2001: 6). In contrast to these visions, this thesis contends that although humans perceive the world through technology, we still perceive from somewhere. We perceive from our body with its pre-reflective intentionality and emotionality: from our body, which is situated in particular settings and relationships. Hence, the thesis rejects the idea that technology makes humans “disembodied” (if anything, humans make technology embodied). We cannot free our mind from our bodies. I believe this is fortunate, as our bodily physicality not only constrains us, but the extraordinary emotional and pre-conscious capacity of the human body also enables us to realize the potential of technological capacity.

At a more general level, the thesis says something about human knowledge, agency and materiality. By supporting Merleau-Ponty’s philosophy of human subjectivity, the thesis challenges the separation of mind from body, nature from culture and reason from emotion, which, as noted by Williams & Bendelow (1998:250), “has been a consistent theme in Western thought, dating as far back as Plato’s deliberations in the Phaedo, Aristotle’s musings in De Anima, and exemplified par excellence in Descartes famous Cogito ergo sum.” The dualistic legacy is certainly reflected in mainstream organizational research where the body is “rarely seen as being relevant to the development of knowledge about organizations” (Dale, 2001:8) and where there has been a tendency to define the rational, objective, detached and disembodied human mind as the seat of truth and knowledge (Ihde, 2002; Turner, 1991; 1996; Williams & Bendelow, 1998). The present thesis can be positioned within the nascent literature that challenges these traditional views. It underlines the need to further rethink the biological in non-reductionist terms. Merleau-Ponty’s philosophy represents one such alternative, viewing human bodies as both physical and cultural beings, as both active and as acted upon. Future research extending this view or developing other ways of connecting social constructivism and materialism is certainly warranted.

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14 Hence, this thesis extends the view of, e.g., Dale (2001), who, although arguing that we will never be able to escape our physicality, still portrays it as constraining. For example, Dale (2001: 41) writes, “in many ways, the dream of escape from the physical body turns out to be an illusion. The lived body resists and reminds the would-be transcendental ego of its constant and inevitable presence. While the mind is surfing the Net, finding its transcendental ego identity in cyberspace, the physical body develops eyestrain, injury…”

15 Feminist writers have criticized Merleau-Ponty for producing non-gendered bodies by ignoring that there are multiple bodies and that bodies are socially constituted, thereby positioning the body as the transcendental “being for itself”, the place Husserl previously reserved for consciousness. I find this unfair, as Merleau-Ponty does write about the situatedness of bodily perception and action. For those interested in this criticism, see Butler, 1990; Dale, 2001; Irigaray, 1993; Young, 1980.
I would like to particularly encourage researchers to theorize in new ways about emotionality. The (limited) organizational and management research on emotions has not been radical enough. It has been dominated by Hochschild’s (1983) theory of emotional labor, which refers to emotions in cognitive terms and not as embodied experiences (Knights & Thanem, 2005). The theory of emotional labor further makes a clear distinction between ‘authentic’ and ‘fabricated’ emotions. This has produced research discussing the negative consequences generated by care workers’ expression of fabricated, ‘imposed’ emotions (see discussion in Lopez, 2006). The present thesis approaches human emotion from a very different perspective, highlighting the intelligent role emotion — as a bodily capacity — plays in human experience (cf. Fineman, 2000; 2003; Nussbaum, 2001; Sturdy, 2003). The thesis suggests that emotions can be viewed as enabling resources that allow individuals to perceive and respond effectively to circumstances in their surroundings. The thesis further questions the strict separation between ‘genuine’ and fabricated emotions (cf. Fineman, 2000; 2003; Wouters, 1989). Drawing on Merleau-Ponty (1962), it argues that emotions are never completely ‘private’, shaped only by the individual’s inner, authentic, subjectivity. Emotions always incorporate the context, i.e. emotions are always partly ‘fabricated’ or ‘imposed’. Still, this does not preclude those representing necessary and crucial resources in human action. Future research needs to acknowledge this and investigate the various ‘rational’, ‘effective’ enabling and necessary roles emotion plays in human practice. This would help us to challenge the reason/emotion duality.
Practical implications

“The elderly” have traditionally been associated with a negative attitude to new technology. To start with, the present thesis criticizes this generalization of ‘the elderly.’ The thesis also challenges the view of the elderly as technophobians by providing an example of elderly caretakers reacting differently, but overall very positive to new technology. The majority of the studied seniors feel safer and more cared for thanks to the new technology, which indicates that new technology can be marketed as providing emotions and social contact. It is, however, important to note that the studied setting is characterized by most of the seniors being satisfied with the care services they receive, partly as they enjoy a good relationship with the care personnel (cf Study 1). The seniors’ uncritical attitude to the new technology is presumably linked to their conviction that the familiar care personnel, who they trust, use the technology. This suggests that new technologies may easily be accepted among senior consumers, given that they are associated with ‘trusted’ personnel (cf. Essén & Wikström, 2005). Note, however, that this kind of uncritical attitude and trust in personnel could easily be misused.

The care workers were also positive to the new technology. The technology used is far from sensational and this fact most likely led to more modest changes in the cases studied. The care workers, however, gradually learned about the new technology, clearly seeing how it could potentially create value in their work. This is relevant to point out as the elderly care setting is far from computerized and there is a widespread belief about the negative attitude among home-help personnel toward technology (Essén, 2003; Essén & Conrick, 2007). In point of fact, there are strong doubts about the possibility of using high-tech in “the high-touch care setting. This thesis suggests that this encounter may be fruitful and it reports how, in the cases studied, technology did not threaten ‘genuine’ or personal care. However, generating value from new, ‘emerging’ technology is difficult and will undoubtedly require much work (cf. Essén & Conrick, 2007). The present findings particularly illustrate how organizational factors impede the care workers’ exploration and exploitation of the new functionality. For example, as noted in

16 The seniors in this study were not interested in knowing any details about the new functionality of the new technology. This reaction may be related to the specific generation and cohort (elderly born 1910-1930) studied. Future elderly caretakers, born 1940 and later may be more interested in technology itself and may be more inclined to critically evaluating new technology.
Study 3, there is no “innovation climate” in the Swedish public elderly care setting (cf. Essén, 2008). The financial and hierarchical structure of the Swedish healthcare system impedes innovative, long-term investments as well as the realization of innovations emerging at the grass-root level. This is nothing new to care managers but needs to be recognized by policy makers, especially considering the rhetoric about how ‘there is promise in new technology’ in political reports (e.g., IT-strategy, 2006; SOU, 2002).

Concerning the relationship between new technology and cost-savings, I can only modestly discuss what my observations indicate. What emerges from the studies is that introducing new technology implies additional costs rather than cost-savings. The studies suggest that technology can extend care workers’ perception and thus enable them to notice more problems and needs among seniors, which, in turn, increase their need to visit the seniors. This implies an increased work burden and rising rather than falling service production costs. Of course, the findings reported here are tied to the specific technology used: a monitoring system that generates new data about a new aspect of the caretakers’ health. Many new technologies, however, provide this kind of ‘service’ and functionality.

In relation to this point, the thesis suggests that technology does not necessarily reduce variability in care practice; it rather increases variability (see study 2). This runs counter to the vision that telehealth will reduce (undesirable) variability in terms of exceptions and errors, as is often claimed by telehealth enthusiasts. It similarly contradicts the fear that technology will contribute to a more standardized care in terms of a more mechanized and non-adjusted care. This thesis suggests that technology can contribute to a more person-adjusted care because it provides more nuanced information about the patient. This, in turn, creates a more complex work environment where new ambiguous problems and exceptions occur. It should not be neglected that this leads to a situation in which care workers need more authority and new types of competence, which may be associated with increased wage and educational costs.

In short, in the cases studied the use of technology points to increased costs. These costs need to be juxtaposed to the quality gains produced by the

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17 In this context I would like to underline that studying the implications of new technology in elderly care is a challenge. To start with, it is difficult to find cases to study, as few public care givers use new technology. Moreover, because of the financial constraints providers suffer, it is difficult to initiate projects, i.e. inspire providers to invest in new technology. This also implies that for those providers who do invest in new technology, there are few resources available for ongoing support and education of users. As a result, projects tend to be small-scale and the new technical functionality tends to be far from exploited, i.e. the technology is typically underused (as in the cases studied here). These circumstances impede the use of and value produced through new technology, which makes it difficult for researchers to draw conclusions about the consequences of technology. What remains for researchers is to be attentive to what these kinds of projects indicate. This is relevant for those engaged in research policy.
use of technology. As resources are certainly limited, alternative costs should also be considered.

Overall, this thesis suggests that technology should not be viewed as a replacement but as a complement to care workers in today’s elderly care system (Varlander, 2007; Wikstrom et al., 2002 provide similar insights in other service settings). Given my observations, I strongly believe that it would be devastating to replace face-to-face visits with electronic surveillance. There are simply no “unnecessary” visits to reduce. Seniors certainly need the few visits they do receive. Further, I want to underline the fantastic job many homehelpers perform when paying these visits. Those who do make an effort to make seniors feel cared for and seen (and I believe most do) make such a difference (see Studies 1 and 2). This should be highlighted and rewarded more than it is in current care practice.

To summarize, the present thesis indicates that, as a complement to human labor, new technology may increase the quality of care and thus at an increased cost. The question remains: Who is willing to invest in new technology given these conditions? There are financial incentives for private caregivers to introduce new technology to consumers willing to pay out of their own pocket for its qualitative benefits. Public care organizations, on the other hand, do not have the financial resources to provide ‘new’ qualitative benefits to seniors if they cannot expect a financial return on the investment (see Study 3). Consequently, although the development of new, increasingly sophisticated telehealth technologies will most likely accelerate in the future, the willingness/capability among public care providers to invest in such technologies cannot be taken for granted. This is relevant to note for care policy makers. An expanded use of new technology in community care, which appears to be what the Swedish government wants (e.g., IT-strategy, 2006), requires support in terms of information/education, financial incentives and perhaps organizational changes.

Finally, claiming that the human body and its emotions are important is nothing new. Claiming that our intelligence and consciousness reside in our body and that our emotions are rational is less established, however. Think about it: don’t we all somehow think of emotion and physicality as the opposite of ‘rationality’? Questioning this opposition should inspire us to change and innovate in various ways. For example, telehealth technologies are often criticized for not being user-friendly (e.g., Essén, 2003; Scandurra, 2008). Certainly, the interrelated nature of emotion and reason makes technology development appear more exciting but also more challenging. Technology developers need to recognize that: to develop machines that truly contribute to human settings, we must ask not only how the human mind or intellect works (and try to copy this) but also consider the various needs and roles played by our physicality and emotionality. How can we develop technology that extends our body, including its pre-reflective capacities, in valuable ways? For example, how can we develop technology that stimulates care
workers’ capacity to show human warmth to seniors? In general, how can we allow our emotional intelligence to thrive? Perhaps new forms of education, such as incorporating more art and literature can help us learn about our ‘passionate rationality’. Isn’t this what makes the world go round?
References


Scandurra, I. (2008). Building Usability into Health Informatics: Development and Evaluation of Information Systems for Shared Homecare. Doctoral thesis Uppsala University, Faculty of Medicine, Department of Medical Sciences, Biomedical Informatics and Engineering urn:nbn:se:uu:diva-8403.


PART TWO: THE STUDIES
The studies:

1. *The Role of Emotion in Service Evaluation: Senior Citizens’ Assessments of Long-term Care services*. Authors: Essén, Anna & Wiström, Solveig. This paper has been accepted for publication in Managing Service Quality. It will appear in Vol. 18 No. 2, 2008.

2. *Variability as a Source of Stability: Studying Routines in the Elderly Home Care setting*. This paper has been resubmitted to Human Relations. It has also been presented at the Academy of Management Meeting in Atlanta, 2007.

3. *The Emergence of Technology-based Service Systems: a Case Study of a Telehealth Project in Sweden*. This paper has been resubmitted to The International Journal of Service Industry Management.


5. *The Corporeality of Learning in Everyday Practice*. This paper has been accepted for presentation at the Academy of Management Meeting in Las Vegas, 2008. It has also been submitted to Human Relations.

As noted above, a re-reading of the five studies (papers) made me aware of how the encounter between individuals and objects in their environment is not one characterized only by analytic reflection. It is also a pragmatic, intuitive, physical and emotional engagement. In general, the studies urged me to think of mind and body, body and world, reason and emotion and the material and ideational as intimately related rather than as opposites. In this section I will account for how they are interrelated.
Paper 1, *The Role of Emotion in Service Evaluation: Senior Citizen’s Assessments of Long-term Care Services*, explores how seniors form an opinion about care services, including the assistive technologies provided to them. The paper reveals that emotion plays a central role in their evaluations. Certain aspects of services contribute to the seniors reaching emotional states, and this is what the seniors initially refer to when explaining their judgments. They primarily remember events that have evoked in them emotional reactions. Their emotions further steer their reflective attention to these aspects; they typically continue to justify their judgment of these aspects and emotional reactions with fact-based reasoning. Therefore, the paper questions the argument that emotions are opposed to cognition, arguing instead that there is a close relation (co-operation) between reason-based reasoning (analytic, reflective) and more intuitive, emotional, subjective reasoning. In general, the seniors’ perception of care services suggests that they do not engage with the world as calculative, disembodied, mental subjects. Rather, they use their whole body, which is a feeling and living body that includes but is not limited to a mind. In addition, the paper demonstrates how the seniors’ own experience of who they are, their own subjectivity, is influenced by how others see them. This comes across as the notion that the body-subject and the world are interconnected. It is finally worth noting that the seniors’ subjective evaluations had commonalities. Most of them underline the importance of care personnel providing human warmth. Hearing someone else laugh at one’s jokes can make a day.

Paper 2, *Variability as a Source of Stability: Studying Routines in the Elderly Home Care Setting*, demonstrates the ‘messy’ environment of elderly care and how care workers use their body in various ways to respond to the unpredictability of their everyday work. The ‘resources’ used by care workers are not merely brain-related. It is, however, difficult to localize their capabilities in any certain organ. It seems to be an integrated capability, where mind and body, senses and reflection and tacit emotion and discursive facts interact. The paper shows that there is variability in the performance of home-help services. For example, home-helps notice different things depending on what they feel is within their responsibility, which is, in turn, is contingent on their personal history— their “habitus” (Bourdieu, 1977). Inspired by Merleau-Ponty, one can understand this habitus as corporeal, including acquired knowledge, values, ethics and affective modes that are expressed through the body. The paper further shows that technology makes the care workers aware of new dimensions of the health of seniors. This awareness creates additional variability, as the condition of the seniors is far from predictable. Hence, rather than making the care work environment more ordered, the technology studied makes it even more disordered. In general, the paper highlights the ethical, emergent and informal aspects of
care work. This is noteworthy in relation to technology as it demonstrates the remarkable but inevitable complexity of everyday care practice and thus points at what technology would have to be able to if it were to replace humans in this setting.

Paper 3, *The Emergence of Technology-based Service Systems: a Case Study of a Telehealth Project in Sweden* shows that the “potential” of a technology is impossible to determine based solely on its functionality and material attributes (cf. Vargo & Lush, 2004 for a similar discussion). Such factors do play a role, but only in interaction with the users’ body and therefore in relation to various contextual factors. This paper highlights that the care workers’ perception of technology is not a matter of their sensory organs receiving data about the ‘objective’ qualities of the technology, their mind later interpreting this data in a reflective way, followed by the actual use of the technology as a final stage. Perception and action are more closely linked than this. The care workers do certain things that make them realize what they can accomplish by incorporating technology. In general, what the users see the technology as largely depends on what they perceive that it enables them to *do*. This, in turn is linked to their own body (what it can acknowledge, what it feels and its incorporation and rejection of social values) and concrete factors, such as the facilities and time resources available. Overall, the paper highlights the relevance of thinking of the body as simultaneously situated in a micro and a macro context, showing that developments do not take place at one level (e.g., the social level or the biological level). Instead, factors at the micro and macro level interact through the users’ bodies. As suggested by Merleau-Ponty’s theory, human action is not mental or physical or cultural. It is everything at once.

Paper 4, *The Two Facets of Electronic Care Surveillance: Exploring the Elderly Caretaker’s View*, highlights the relevance of investigating the role and implications of technology from the user’s perspective. The variability in the experiences of the seniors could not be predicted from an outside perspective because it is related to the seniors’ emotional reactions to the technology. The paper reveals that the seniors’ emotions are related to their subconscious as well as conscious assumptions about their own condition, what is normal, what is private, what one should hide and about the interests of care providers. The paper illustrates that the personal desires of the seniors (e.g., to continue living in their own homes and fear of moving to a nursing home) and view of themselves (their own frailty) strongly shape their experience of technology and its implications. Their belief that they are in need of supervision, that technology can contribute to them being able to live in their own home and thus prevent them from being placed at a nursing home strongly influence their experience. In short, it is not so much the material
properties of the technology but rather how the seniors feel about the technology that matters to them. These feelings are physical as well as mental. In addition, they are in a sense helpful, guiding the seniors in their judgments. This is done in ways that are difficult to predict but very understandable and far from completely random when considering the whole context.

Paper 5, *The Corporeality of Learning in Everyday Practice*, rejects the prevailing view that knowledge is something that resides solely in the mind, arguing that knowledge rather resides in our whole body. The paper challenges the superiority of humans’ analytic and reflective capability, claiming instead that pre-reflective know-how is what we should understand as expertise. It is maintained that to know is to be physically able to perform actions without reflecting on how. That is, humans know when their body remembers and ‘takes care of’ things, which would eliminate the need for conscious reflection. For example, the paper exemplifies that care workers gradually learn to master technology by incorporating it into their body schema. The more they use the technology, the less they reflect on how to use it, integrating its capacity with their other emotional and sensory capabilities pre-reflectively. In general, the paper points out that care workers experience-based bodily responsiveness to the environment plays a central role in the delivery of care services. What emerges from Paper 4 is that care work is not primarily about generalization and deduction but about understanding the individual and subjective. The care workers’ bodily capability to pre-reflectively perceive and respond to such particular issues makes them possible to handle. Without this bodily competence, care work would be immensely complex and time consuming.
Appendices
Empirical data generation – overview

<table>
<thead>
<tr>
<th>Year</th>
<th>Activities</th>
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<tbody>
<tr>
<td>2003</td>
<td>In depth interviews with actors involved in the development of smart senior homes and telehealth technology. Performed as part of another research project. Presented in Essén (2003).</td>
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<tr>
<td>2004</td>
<td>All year: Several meetings, phone and email-communication with public community care managers in Heby (B) and representatives from primary care in Heby. Primary care representatives later decided to reject the offer to participate in the project.</td>
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<tr>
<td>Dec:</td>
<td>Visiting the technology provider in Finland with Heby managers.</td>
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<tr>
<td>2005</td>
<td>All year: Meetings, phone and email-communication with Heby managers.</td>
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<tr>
<td>Feb-Mar:</td>
<td>In depth interviews with 26 seniors in Heby before the monitoring system was implemented.</td>
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<tr>
<td>Sept-Oct:</td>
<td>The technology was installed in Heby.</td>
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<tr>
<td>Dec:</td>
<td>In depth interviews with care managers/gate-keepers, managerial and operational personnel in Heby about their way of organizing their work at overall level.</td>
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<tr>
<td>2006</td>
<td>All year: Meetings, phone- or email-communication with Heby managers and operational personnel several times each month.</td>
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<tr>
<td>May-July:</td>
<td>In depth interviews with managerial and operational personnel in Heby about their intentions with, actual use of and consequences of the new alarms. Studying service documentation.</td>
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<tr>
<td>July:</td>
<td>Interviews with actors involved in the development of smart senior homes and telehealth technology (complementing interviews performed in 2003).</td>
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<tr>
<td>July:</td>
<td>Participation at a 2-day senior technology workshop organized by the county council of Halland in Sweden (complementing interviews performed in 2003).</td>
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<tr>
<td>August:</td>
<td>Participant observations, two days, 4 occasions in Heby (I joined two home-health aids during their visits to seniors).</td>
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It is worth noting that repeated visits and interviews with seniors in their homes gave me a “feeling” of what their every-day life is about. Indeed, I talked to them, their relatives and family several times beyond what is specified in the studies. Similarly, I have had informal meetings with politicians (at the ministry of health), participants in another telehealth project in Sweden, technology developers and managers from other communities (at conferences) to grasp the overall, macro context of care. I also worked at care provider A during a summer. This gave me insight in the structural as well as everyday conditions under which care providers operate.
**October:** Accessing documentation about the monitored seniors e.g., on the Heby municipal service provision, and the electronic log file of the no. of alarms triggered during the study period

**Sept-October:** In depth interviews with the monitored seniors about their experience of the new alarms.

<table>
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<th>2007</th>
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<td><strong>All year:</strong> Phone or email communication with managers and home-help group-leaders, approximately 8 times this year.</td>
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<th>2008</th>
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<td><strong>July-August:</strong> 10 follow-up telephone calls related to specific papers being written.</td>
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<tr>
<td><strong>2008</strong></td>
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<td>Brief phone calls to clarify issues in interview transcripts.</td>
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The technology used: an activity monitoring system

The monitoring alarms include sensors that automatically and continuously collect information about the seniors’ micro and macro-activity level, skin temperature and skin conductivity. The wrist-worn monitoring alarm transmits the collected information wirelessly, to a home base unit. The home base unit analyses the information via certain algorithms. During the first two days of use, the base unit registers and “learns” the user’s normal activity level. Thereafter, the unit continuously and automatically analyze the information about the senior’s activity level. The home base unit summarizes the data into an overall “activity-level” and transmits this data to predefined recipients, in this case to a shared PC at the municipal care unit in Heby. Care personnel could access the non-emergency information presented in the form of graphical activity-curves on the PC screen (see fig 2) at any time. The activity curves illustrate e.g., during what period the seniors has been sleeping, has been out of his/her home, sleep/wake rhythms over time, and how many alarms that have been triggered and attended to. The activity curves further indicate if a senior is not wearing his/her alarm. Moreover, the wrist unit continuously monitors its own operation, providing notifications on low batteries and connection problems.

If the monitoring unit detects a significant change, i.e., that an individual’s micro/macro activity levels diverge from the individual’s registered “normal” values, the unit automatically triggers an alarm. Such a situation could be the inactivity resulting from a bad fall and loss of consciousness. The alarms are transmitted through the telephone network to predefined alarm recipients, in this case to SOS Alarm in Västerås. When manual/automatic alarms (emergency information) are received at SOS, operators contact patient via speakerphone, just like when using traditional safety alarms. If there is an emergency, the operators contact the community personnel on duty. In such cases, the community personnel can retrieve real-time information about the senior’s monitored activity level during the last 30 minutes as well as the last 9-24 hours.

Seniors graphical activity history is stored and may be retrieved by community care personnel at any time in order to analyze trends in the senior’s activity patterns. In theory, the activity history could also be printed and faxed or emailed to primary care personnel who can use this information to analyze effects of medication etc.
The activity monitoring system

Activity curve during 24 h.