Using Technologies with Care
Notes on Technology Assimilation Processes in Home Care

Carl Johan Orre
Cover: The photos on the cover are pages from a group diary used by one of the workgroups studied in this thesis.
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Abstract

Elderly care is currently undergoing a phase of development in which new technologies are anticipated to increase efficiency, secure quality of services and give care assistants more time with the elderly people. This thesis reports on a study of how people involve technologies in everyday home care work. It focuses on assimilation processes associated with people’s use of information and communication technologies (ICT) and other technologies. The main problem addressed in the thesis is how do care assistants assimilate new emerging technologies in their work practice? The aim of this study is to gain an understanding of assimilation processes and the ways that people learn and select different features of technologies in practice. Technology assimilation processes are in this work assumed being part of people’s everyday use and exploration of the technologies they have at hand. The underpinning fieldwork commenced 2001 and ended 2006 and comprises ethnographical workplace studies in three different home care organisations.

When new technologies are brought into an organisation they are not introduced into a vacuum; the thesis shows they are introduced into an existing ecology of work, where links between technologies and resources are tightly associated with ways people deal with contingencies and coordination. The result of the study show that when individuals and workgroups configure their own web of supporting technologies they also reconfigure their workplace. In this work it is revealed that the home care geography holds two main activity domains which provide radically different conditions for technology use. How people effectively manage to balance their work in the two domains is seen as a crucial component in how we can understand use of new technologies. It is also concluded that the involvement of new technologies effect the structure of work as the care assistants either loose or are given a strengthened autonomy and control in their work. This is a relationship that is effected by and dependent on the different ways new technologies are involved and used.

Assimilation processes are in this work understood as an ongoing orchestration of tools and technologies. They are catalysed through the conflict between new and established routines and the provision of a social space of innovation, which call for the ability to detect aspects in current practices that could be sorted out, retained and selected to be part of innovation. In home care, an example such innovation is found in innovative ways managing technologies and their involvement in practice. The challenge is to grasp how everyday assimilation processes can strategically advance practice as a whole. The perspective offered by - using technologies with care - suggests a different view on innovation. Such a view focuses on innovative use and workplace configurations, as it is aware of novel technical configurations.
To my family
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*Omberget, 19th of April 2009*

Carljohan
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Introduction

Computerisation brings about change in the workplace and numerous studies have documented that the use of ICT redirects work activities and radically reshapes social practices at work (Zuboff, 1988; Kling, 1978; Orlikowski, 1991; Kling 1996; Zuboff, 1996; Kling, 2000; Ciborra, 2001; Wiberg, 2004; Avgerou et al., 2004). ICT support in organisations has extended far beyond early conceptualisations of office automation to the point that the use of ICT and mobile ICT enables new organisational processes and new configurations of work (Jacksson, 2002; Scheepers and Scheepers, 2004). An increasingly technological workplace has become more or less dependent on the use of ICT. ICT is an integral part of the texture of organisations (Bowker and Star, 1999; Hanseth and Lundberg, 1999; Star and Ruhleder, 1996). A combination of introducing new technological developments at a steady rate and an increased complexity in these technologies intensifies the need to learn more about how people use and involve new technologies in work practice. It is also necessary to explore the effects brought about by the transformation processes that are in motion (Nilsson, 2006; Thackara, 2005; Scheepers and Scheepers, 2004; Lucas Jr. and Spitler, 2000; Lyttinen et al, 1998).

This thesis explores the assimilation processes of new technological developments in home care, together with their effects. To be specific, I have chosen to examine the work of care assistants. In many healthcare professions today, new ICT are introduced on a broad scale (Jansson, 2007; Hedström, 2004). I have chosen to focus on the workgroups and care assistants engaged
Home care is an occupation that is currently subject to a computerisation process; ICT, and in some cases mobile ICT, are being introduced and implemented on a broad scale. Home care work involves tending to people’s basic everyday needs within their home environment. It is not work commonly associated with the use of the latest technology. However, home care practice has always involved the use of technologies (Hedström, 2003). Common to the trade are those found in traditional medical appliances, domestic appliances and ergonomic appliances. However, care assistants working in home care are currently faced with a situation where traditional routines and traditional tools are being challenged by ICT and mobile ICT. Efficiency motivates the use of ICT in situations where the use or redistribution of how time can be used is often a core focus. Care work involves hard physical labour. In traditional office-oriented work, people accomplish a considerable proportion of their work using computers. Analytical, logical and creative abilities and skills are required for such work (Kallinikos, 2000). The introduction of ICT in home care does not make the care situation less physically back-breaking; rather, it adds new dimensions to the daily activities that have to be managed and to the organisation of work as a whole. Home care is typically seen as women dominated work, with all the connotations this implies. In some cases, ICT is believed to make home care work appear more attractive for young people, including men. However, the effects evoked by any initiatives on any level are currently poorly investigated (Hedström, 2004; Jansson, 2007).

An essential factor and assumption in this thesis is that new technologies challenge the way that organisations currently deal with change. ICT is often used as a tool when change is anticipated. An essential point of departure is that people in such situations do not just adapt to ICT systems, they adapt ICT systems to meet their needs (Orlikowski, 1992; O’Day, 1996; Jasperson et al, 1999; Ackerman, 2001). The use of ICT and organisational change are
two tightly coupled activities as people’s use of technology transforms how work is managed over time. Traditional notions of change, focusing on the implementation of technology, saw change in organisations as controllable and manageable within fixed time frames which require a quite stable environment, something of a rare find nowadays. The complexity of an increasingly technological workplace means that approaches to change must offer flexible solutions that are open-ended, customisable, complex and flexible. They must also be able to accommodate ongoing and iterative experimentation (Orlikowski and Hofman, 1997). Today, ICT is an even more important tool for organisational development and change. When the organisation of work transforms as a consequence of ICT use, the effects that this brings can challenge the organisation as a whole. Organisational change from a ICT use point of view is difficult to manage. Methods and analysis of the implementation, adoption, diffusion and use of collaborative technology in organisational work lie at the heart of research in the form of information systems (IS) and computer-supported cooperative work (CSCW) (cf. Cooper and Zmud, 1990; Orlikowski and Robey; 1991; Orlikowski, 1992b; Orlikowski and Hofman, 1997; Heath and Luff, 2000; Gallivan, 2001; Star and Bowker, 2002). The use of new technologies is a destabilising factor in any workplace. As with every socio-technical system, the workplace continually evolves and is subject to a mixture of conservatism and change (Lemonier, 1993) and people’s commonsense notions are destabilised when new tools challenge established habits and routines.

Another essential factor and assumption in this thesis is that when the availability of ICT is increased, particularly outside of the traditional office desk environment, taking on a mobile, pervasive or embedded character of late technologies, new and different use contexts inevitably come to the forefront (Jegerz and Wiberg, 2006; Cousins and Robey, 2005; Scheepers and Scheepers, 2004; Katz and Aakhus, 2003; Brown et al., 2001; Kopomaa, 2000). Use behaviours reflect and maintain an ecological character and new appliances offer an open, less formal ‘infrastructure’ for social interaction, which appears to affect interaction at work as much as it affects interaction in everyday life (cf. Katz and Aakhus, 2003). Current ICT adoption models do not provide the support needed to cope or to manage the effects that emerge out of people’s use of new technologies (Scheepers and Scheepers, 2004). Consequently, it means that the challenges of using new technologies also affect people’s use of their workplaces. These use contexts are ‘new’ for most organisations and unexplored in terms of what they mean and how they affect practice and strategic decisions. The physical environment in which the activity takes place naturally holds constraints and offers opportunities for when and where people can and cannot make use of ICT. Time and space dimensions are central to the design, implementation and studies of
ICT use to support collaborative activities (Eriksson, 1993; Harrison and Dourish, 1996; Fitzpatrick et al., 1996; Benford et al, 1996; Sahay, 1997; Karsten, 1999; Kirsh, 2001; Bossen, 2002; Fitzpatrik, 2003; Crabtree, 2003; Ciolfi and Bannon, 2005; Crabtree and Rodden, 2008; Wiberg, 2008a). By using the notion of place, as discussed in CSCW one encourages interaction in a shared virtual environment more than by using the notion of space (Harrison and Dourish, 1996). Indeed, the notion of space offers little help for spatial navigation. On the other hand, place in the physical world has its unique characteristics and landmarks, which support social and spatial navigation. Independently if it concerns virtual and physical space, how we make use of different workplaces is central to the study of work (Hutchins, 1996; Orr, 1996; Bowker; 1997; Bertelsen and Nielsen, 1999). Studies of new emerging technologies have shown that they have a direct connection to how people make use of different places of work (Moran and Dourish, 2001; Agre, 2001; Laurier, 2001; Brodie, 2003; Scheepers and Scheepers, 2004; Dourish, 2004; Ciolfi and Bannon, 2005; Lindgren and Henfridsson, 2005; Dourish, 2006; Crabtree and Rodden, 2008; Lindgren et al., 2008; Wiberg, 2008b). A mobile phone for example, holds the link to resources that might be necessary and supportive, whether or not it is a person or a specific piece of information that is sought after (Kopomaa, 2000; Laurier, 2001) and the use of new technologies seems changing established notions of what is appropriate. Simply by using mobile ICT, it is possible to create temporal locales and places for work activity (Agre, 2001; Ling and Haddon, 2001; Castells, 2006). It would be fair to say that by using mobile ICT you are simply given a new repertoire of behaviours independently of many situations. Use of mobile ICT offers additional opportunities to re-encounter everyday space in new ways. It adds new dimensions to a work or other activity which were not there before. It emphasises a change in the physical setting and this is an essential observation, because use of these technologies seems to establish important linkages between spatiality and practice (Dourish, 2006a; Chalmers, 2004; Brown and Perry, 2002; Agre, 2001).

Postman (1995) asserts that

"...technological change is not additive; it is ecological. A new technology does not merely add something; it changes everything (p. 192)."

New technologies thus challenge the organisational landscape at several different levels. This is indeed a challenge for any stakeholder dealing with change. Perspectives which is turned towards an ecological view on the organisational landscape its work and social practices offer many different tools to search for information on how we understand work activities involving technology (Kaptelinin and Czerwinski, 2007; Spinuzzi, 2003; Luff et al, 2003; Sellen and Harper, 2001; Nardi and O’Day, 1999; Star and Ruhlander,
1996; Star, 1995a; 1995b). In a study by Spinuzzi (2003), the focus is set on how people and multiple artefacts that mediate their work activities—such as documentation, interfaces and annotations—are enmeshed together (Spinuzzi and Zachary, 2000; Spinuzzi, 2003). This view is concerned with how people interpret different tools. The term 'genres' is used to highlight the salient linkages between how improvised and often ephemeral innovation are used in organisational practice. Spinuzzi’s genre ecology framework aims to find out how these innovations can be traced and understood to enrich design and development of information environments. The view offered by Spinuzzi does not put a direct focus on any particular tool or technology. It includes tools and technologies that people choose to configure and assemble in order to get their work done. ICT is naturally not the only tool being used in work practice and computer technology is not suited to supporting all the activities that occur in a workplace.

These configurations are a complex integration of localised tools and resources; over time, they are as important a part of an office as the people working there (Sellen and Harper, 2001). Nardi and O’Day (1999) pursue the use of technology at work using a metaphor for how people and multiple artefacts embrace the social context of work, developed through their use of technology. They pay particular attention to the information ecology of work as a metaphor to unpack the complex interactions that make up people’s use of technology. They turn the spotlight onto practical use and how we shape the use of technology in accordance with surrounding conditions and constraints (cf. Balka and Wagner, 2006). From all these perspectives, the use of technologies is a natural part of what we do. We cannot separate it from the work context without considering the linkages it has to other tools and resources within that work context. The users of a certain technology are responsible for integrating the tool into the work they do, just as the designers are responsible for a well-considered and thought through design. When people do care about how they use their technologies, their values and commitment will affect how technologies are assimilated into organisational work. They will also have important things to say about their use. It is therefore a good reason for more people to be fully engaged in discussions and decisions on technology (Nardi and O’Day, 1999; Jansson, 2007; Convertino et al, 2007) and for a practice-oriented perspective to be taken into account. Available models on change do not seem to handle difficult situations with the conditions and problems evoked by new open-ended technologies (Orlikowski and Hofman, 1997; Schepers and Schepers, 2004).

People’s use of different technologies and the process of making them their own can be found in the related discourse and literature and are discussed either in terms of people’s appropriation of a particular system of technology (Ciborra, 1996; Dourish, 1996; 2003) or from the point of view of
how people assimilate a system or technology (cf. Fichman, 2000; Zmud, 1999; Gallivan, 2001). These two are closely related process concepts, where assimilation is a necessary pre-requisite of appropriation. In Dourish’s words, appropriation is “the way in which technologies are adapted, adopted and incorporated into working practice” (2003, p. 467). It describes a process where the individual takes the technology for himself or for his own use. It holds that people in the process do take ownership of the technologies required in the work situation. Orlikowski and Hoffman (1997) explain an improvisational model of change management where change is dealt with in three dimensions in a situation which involves the introduction of new technology. Here change is seen as an ongoing process of alteration between: anticipated change, which includes effects that are planned and sought; emergent change, which addresses local and spontaneous changes not anticipated before; and opportunity-based change, which refers to those openings suddenly available due to the implementation new technologies.

Gallivan (2001) gives a comprehensive overview of technology adoption and acceptance research that deals with authority driven implementation. Gallivan (2001) also deals with secondary adoption; in other words, the individual adoption and organisational assimilation stages that follow adoption, namely adaptation, acceptance, routinisation and infusion. Thus, he offers a hybrid framework in which are structured the flow of assimilation stages with individuals, workgroups and organisation-wide levels of adoption. Gallivan’s framework thus offers both depth and width of assimilation of technologies in organisations; a process in which he identifies a feedback loop where experiences and consequences of earlier stages of implementation provide a reoccurring cycle that signifies the dynamics of technology implementation. He does not, however, give any guidance on how this feedback loop works and how it should be approached. Gallivan (2001) provides an extensive reading guide into innovation adoption and diffusion literature, showing that organisational-level user adoption and technology use do not matter as much as how extensively an innovation is used in the organisation and how that use alters the processes and structures in the organisational culture. It is a notion generally referred to as an innovation’s degree of assimilation, or the assimilation stage in the organisation (Meyer and Goes, 1988; Finchman and Kemerer, 1997; Fichman, 2000; Gallivan, 2001). It seems however that the assimilation stage not discern actual use and the role of practice in assimilation processes, which I clearly associated with the feedback loop identified by Gallivan, as it focus on the number of users and how extensively an innovation is used.

“...Assimilation may be divided into two sub-constructs: breadth and depth of technology use. Breadth of use refers to the number of adopters within a firm (also labelled internal diffusion), while depth of use is a less tangible
construct describing how extensively the innovation is used and its level of impact within the firm...” (Gallivan, 2001; p).

Bødker et al. (2004) provide a case where the frameworks offered by Orlikowski and Hoffman (1997) and Gallivan (2001) are recognised. Their study shows that their work has validity, demonstrating how change can be categorised as anticipated, emergent and opportunity. They also show that these levels do not offer support to the depth of change identified in their study. Instead, with support by Gallivan’s (2001) model, they choose to distinguish between organisational/infrastructural change and workgroup level changes. They do so in order to account both for a practice-oriented level related to dynamic reconfigurations and an organisation’s motivation for adoption decisions (Bødker et al., 2004). In a similar vein, Mioduser et al. (2003) explore the depth of assimilation and its relation to practice. They present three general levels of innovation in studies on how ICT changes work practice within education and teacher practice. In their work, each stage or level deepens the relationship between the use of technology and practice. The first level put forward is assimilation; thus, how new technologies are approached. The second level concerns transition phases, where new and traditional ways and routines co-exist. Finally, the transformation deals with the degree to which changes in practice and new behaviours alter the workplace. For each of these frameworks, what is clear from the outset is that the assimilation of technology is anything but a linear process. Their dynamics are heavily dependent on understanding those work practices in which new technologies are involved. This is clearly illustrated by the effects on the implementation and assimilation of Lotus Quick Place in Summa that were identified by Bødker et al. (2004).

Ciborra (1996) offers a view which focuses on innovation and the implementation of technologies, and the role of work practice. He places emphasis on the role played by people who take care of innovations which have fallen into a context of use (Ibid). From his perspective, assimilation is a learning process in which the available means and resources together provide the conditions for innovation and change (Lave and Wenger, 1991; Wenger, 1998; Nicolini et al, 2003). Here, innovation is a natural component of the practical accomplishment of everyday work; thus, it includes possible points of reference to the contextual conditions as available means and resources, together with the work and practice in which the technology becomes involved. The underpinning idea is that people and the organisation care for an innovation, such as a new system or a new configuration of the features of several different but compatible systems, treating it as a guest in the organisation. It implies organisational behaviours where its members learn more about how technological resources are used in the organisational landscape.
It also involves a responsibility for how use affects clients and customers in the organisation, as well as how these relationships can be improved.

Gallivan’s framework described above differs on several points with regard to the view on caring for the innovations in the organisational landscape. From a caring perspective, assimilation processes are about learning and facing the challenges of organisational transformation brought about by the involvement and use of ICT. A noteworthy observation is that new technologies are judged in comparison with those which they replace (Berg, 1997). As new technologies are introduced into a web of existing tools and technological supports, the influence that existing technologies has on the use of new technologies makes it rather important to know how tasks were solved before. Following the ideas and points of departure above, I arrive at an indicative definition of assimilation processes. Assimilation processes do not only relate to an incorporation of something new, replacing what was there before. It is as important to ascertain what the new technologies replace. It is:

“the ways through which people learn, select and appropriate technologies in working practice”.

The use of different technologies is part of practice and part of its development. For people who do not participate in shop floor practice, it is easier to discuss promising features regarding the implementation of a new system or gains brought about by an innovation than it is to discuss and focus on the innovations that have been around for some time, based on the incremental development of their use. The more an innovation gets ingrained into work organisation, the more it becomes an invisible part of the world at work (Moran and Anderson, 1990; Ciborra, 1996). It shows sensitivity to the ongoing development of work practice. In the case of home care practice, work organisation differs in scope and meaning depending on the social system of which it is a part (Jansson, 2007; Nilsson, 2008; Hedström, 2004; Orre and Watts, 2006). It even differs between municipalities and districts within the same country (Jansson, 2008; Hedström, 2004).

In Sweden, the reform of elderly care, known as ‘Ädelreformen’, regulates the relationship between the two administrative levels found in the county council and the local municipal authority. Current legislation (cf. Bergstrand, 2003) means that the municipalities can enjoy great freedom in how they organise their home care services (Jansson, 2008). However, organisation is only one side of the coin; the other is the actual service work that is performed. In the studies that underpin this thesis, people’s use of new and established technologies in providing a home care service has been the main focus. Although there is a difference in how home care is organised, I nevertheless assert that certain aspects of field practice share more similarities than differences. Home care work is more of a cooperative and collaborative
activity and practice. It is a work context that involves mobile collaborative work practice, where information and interactive aspects are distributed in and through a multitude of devices. In home care, there is a clear tension between what I see as mobile and distributed work on the one hand, and stationary and collocated work on the other.

These characteristics of home care practice fall nicely into the domain of CSCW-oriented research, which concerns the use of technologies in collaborative activities (cf. Heath and Luff, 1991; Schmidt and Simone, 1996; Ackerman, 2000). The firm concepts and ideas that have been developed by the CSCW community over time provide well-adjusted keys to an analysis of the activities that make up the ecologies of work. Ecologies are dependent on practices and activities that define them. They are the ‘undergrowth’ in organisational work. Studies in the field of CSCW with a focus on home care are found in Pinelle and Gutwin (2002; 2003; 2006; 2005) who explored home care in Canada. They focused on the design and development of technological support for the coordination requirements of loosely coupled groups. They provide a well-founded design framework that capitalises on the characteristics of multidisciplinary home care practice. Their work offers suggestions for how documentation and communication of case information can be managed.

Nilsson and Hertzum (2005) report their analysis of home care in Denmark and mobile collaborative work in terms of coordinating rhythms. They describe how major temporal organisation is furnished by individual, collective and social rhythms, which collectively bring about the collaborative flow of activities. In an account of value-laden technology, such as ICT, the individual, collective and social rhythms are noteworthy, since they are illustrative of the constraints on the time, location and activity of home care workers and the difficulties in articulating work schedules. Nilsson (2008), does in fact show, in his comprehensive study, that ICT is not an answer to all needs and that anticipated effects motivate ICT investments by the elderly care administration in Copenhagen, Denmark. The view of ICT as a great problem solver also reflects to a fair extent the initial political motives underpinning the introduction of ICT in elderly care in Sweden. It was also anticipated that the technology would provide a more formal structure of work to secure quality of care. Nilsson (2008) showed that care assistants do not need ICT as a structure in which to engage in their work strategies. Rather, the practice of care work upholds quality independently, at each point of care.

The accounts presented above, together with those given by Hedström (2004) and Jansson (2007) and others, provide a solid foundation for further research; not only for a broadened involvement in discussions on technology use, but also by offering a critical perspective which embraces care
assistants’ practical use of technology, the central features of these technologies, the effect their use has on the organisation of work, the role the different technologies have in the production of service quality. In this vein, I have examined the problem of how care assistants assimilate new emerging technologies in their work practice. In so doing, the following questions directed my attention towards the essential dimensions of practice and the ongoing involvement of technologies in work activities. These questions are:

- How do care assistants manage planning and coordination in their work?
- How do care assistants keep each other informed and aware of each other’s work?
- What effects does the care assistants’ assimilation of new technologies have on the organisation of work?

The answers to these questions are crucial information sources in the search to understand assimilation processes. They offer a potential bridge between interaction and use perspectives of ICT in practice on the one hand and organisational and managerial views of ICT and practice on the other. Where technologies are often used to support people as they effectively manage coordination in cooperative and collaborative activities, we find activities that provide the crucial mechanisms of work practice; thus, where the real action is found (cf. Schmidt, 2001; 2006). The aim of the thesis is to gain an understanding of assimilation processes and the ways that people learn and select different features of technologies in practice which also entail an understanding about what grounds they are appropriated and involved whilst others are not.

**Outcome and result of the study**

This study of assimilation processes reveals that certain features of new technologies are incrementally selected and approved and, over time, these are truly involved in work practice; thus, people do not involve technology on one occasion, they do it repeatedly as work practice develops. It provides concrete examples of the dynamics of organisational transformation. The constant tension that exists between new and established technologies, and between people and their ongoing reconfiguring and adjusting of the workplace are both crucial elements. The study offers empirical and conceptual findings which inform the practice and the informatics community. In particular three contributions that are yielded which through the lens focusing on assimilation processes provide information about aspects of the social context and use of technologies in the organisational landscape. These are,

1. The focus on technology assimilation processes reveals that spatial configuration play a crucial role in a distributed and, at the same time, a collo-
cated work activity when use of technology is considered. The care assistants’ involvement in new technologies in their work practice is influenced by the conditions offered in the place of work. Two crucial locales were identified in the study and the activity of balancing the work in these two locales is seen to be a crucial component in how the production of quality of services in home care can be understood.

2. The focus on technology assimilation processes reveals that care assistants’ use of new technologies seems to have an immediate effect on structures of work. With these new technologies, care assistants are provided with strengthened autonomy and control of their work. They can, without restraint, interact and quickly solve emerging practical problems. Central sources of authority and power in an organisation are altered and renewed by using ICT. More specifically, the study reveals that the coordination methods in these systems are managed in different ways. It is more a matter of autonomy and control belonging to the workgroup as whole than one of administrative efficiency. This observation opens up a discussion of how such a technological support can be involved and promoted on a practical level.

3. The focus on technology assimilation processes reveals that when the care assistants individually or in their workgroups configure their own web of supporting technologies in order to maintain an orderliness in their workplace. They do it as an effective orchestration of available technologies and by cherry picking those features of a new technological support that are of most use to them. However, as the knowledge and meaningfulness of the new technologies increases in workgroups, people involve more features and in the process they slowly let go of established tools. Assimilation is truly a recursive process, where each round deepens the relationships between work practice and technologies in use. The tension between new and established routines provides a social space of innovation of use and use strategies, which all contribute to the development of the work ecology in accordance with surrounding changes.
Irene Greif and Paul Cashman are credited with being the first to publish studies in the field of Computer Supported Collaborative Work (CSCW), in 1986 (Wilson, 1991). They were both computer scientists and they were both involved in projects dealing with office automation. Wilson (1991) provided a definition of CSCW, which identifies the subtle assemblage of both future prospects and the historical roots of an interdisciplinary constitution for which this field is known.

“...CSCW is a generic term which combines the understanding of the way people work in groups with the enabling technologies of computer networking, and associated hardware, software, services and techniques...” (Wilson, 1991, p. 6).

In its early days, office automation kept on failing as a technological project because of the difficulty of providing specifications which were both understandable and reflected real life. Automation is still a technical project and, if we examine the contemporary use of mobile devices, weblogs and newly emerging ways of categorising information (Braa et al, 2000; Efimova and Grudin, 2007; Schmidt, 2007), the problem seems to remain. The way that ICT is deployed in organisational practice still raises a number of challenges. New perspectives were needed then, as they are now.

Technologies are a normal part of social practice. It is therefore essential to explore how these technologies have become part of our social strategies and interaction with others (cf. Nyberg, 2008). In studies on social practice (Bourdieu; 1972; 1986; 1990; Certeau, 1984), we find that the assimilation of
tools and attributes is at the heart of social strategies that determine social positions and the autonomy of social groups (Sterne, 2003). If the use of technologies is an essential part of such strategies, it also means that they are continuously assimilated in specific cultures and social contexts. When a new technology is introduced, work conditions and the way in which people go about their activities is challenged. The rules and relationships that belong to the situation are most probably being altered and renewed. This chapter provides holds the ideas that reflect the ecological perspective that has been adopted in this thesis. The very existence and development of ecologies depends on their being sustained by individuals and their social activities. For this reason, I have turned my attention towards perspectives and approaches to work practice, which explains the social interactions and use of technologies that are central to the aim of this thesis.

Cooperation, Cultural tools and Transformation

Individuals always exist in a social context where the established values, meanings, norms and experiences influence actions and activities. Individuals do not interact in a vacuum, but interact together with other people. Consequently, we learn through the interplay of our own experiences of cultural objects and with the guidance of more capable peers. It is this viewpoint that has led me to understand assimilation as a learning process, and it is a viewpoint which I have used throughout this work. So, even though it seems that individuals interact on their own, human interaction as a social phenomenon is mediated through cultural developed artefacts, such as mobile devices, computers, telephones and language, and through the influence and support of colleagues, friends and family (Kaptelinin and Nardi, 2006).

Activity theory originates from the work of Vygotsky (1978) and Léontiev (1978) and emphasises the historical, mediated, and transformational nature of collaborative activity. It is a framework that offers a general structure of activity and mediation, where individual actions are explained, along with how they relate to and support collaboration and the joint development of cultural tools (Kaptelinin and Nardi, 2006; Nardi; 1996; Engeström, 1987; Engeström et al, 1999). Activity theory presents the core idea that the relationship between an individual and the world is mediated by his or her activities, i.e., his or her interactions with and through environmental objects. An early application of activity theory in computer-oriented research is found in Bødker (1991). Bødkers’ contribution was directed towards the design of user interfaces. She put forward the idea that users do not operate on an interface; rather, they operate through an interface onto other objects and subjects. Activity theory was not broadly accepted at this point and, within the HCI community, it was seen as complex and difficult to learn and apply. What’s more, it was argued that it was difficult to recognise the true benefits
of the ‘theory’. The whole situation led to a more comprehensive outline being produced by Nardi and colleagues (1996). Since then, activity theory has gained ground. We can now find an inclusive account of the framework and its advancements within interaction design in Kaptelinin and Nardi’s work (2006). Activity theory has provided me with a supporting structure, as much for the planning of fieldwork as for field research activity itself.

The core unit in activity theory is human activity, which has its own structure, its own internal transitions and transformations, and its own development (Léontiev, 1978). Activities are directed by our motives, which answer to some evident need and desire that we have. In order to fulfil and satisfy this need, we direct our actions towards an object, which corresponds to this need. These actions are conscious and goal oriented. We have a habit of repeating ourselves, so we produce these actions over and over again and, soon enough, we perform such behaviours without giving them much attention. We just do them. In activity theory, these are seen as unconscious operations, which we internalise in the things we do. It is important to note here that the conditions and the environment in which we perform are constantly changing; in the same way, so do our behaviours as the activity transforms and develops over time. From my understanding, it is this process, the developmental dimension of activity, which signifies the cultural historical orientation of the framework and transformation which has been central to the aim of this thesis.

According to Engeström (2001), activity theory describes cooperation as a collaborative activity. It has one objective, but this is distributed between several actors, each performing one or more actions according to the overall and shared objective of the work (Bardram, 1997, p. 91). The collaborative activity is, in turn, described as a hierarchical structure. In this, coordinated collaborative activity is portrayed as coordinated, collaborative activity as co-operative and collaborative activity as co-constructive. The relationship between an individual’s work activities and the work activities of her peers is subject to a division of work. It is also regulated by different more or less explicit rules and norms, which belong to the work context. The coordinated characteristic of work activities captures the normal and routine flow of interaction. At this juncture, individuals do the things they do within the scope and outline of their role in the overall workflow towards a commonly defined goal. Activities which work towards the common object are thus externally related, i.e. the activities are separated and the individual only realises the whole of the activity from the point of view of their own individual activity (Bardram, 1997, p. 91). Work activities are regulated and are coded into written rules, plans in schedules or tacitly assumed traditions and norms. Coordination ensures that this flow of work activities functions smoothly in the course of daily routines.
Activity theory and developmental work research offers a perspective that makes inner contradictions explicit in the social context (Engeström, 2001). Workgroups can be understood as intermediate activity systems, between the level of the entire social work organisation and the level of an individual care assistant. Accordingly, and this is crucial here, the activity system of an individual or group is studied and represented in a wider activity context, set against the associated historical background. An holistic analysis of the activity system is critical, because it directs focus onto the organisational context as a whole. When people in a cooperative practice explicitly question and reflect on their object of work and the means of supporting their shared work activities, they are in the process of co-constructing the established order of the shared activity. New conditions, i.e. ‘coordination breakdowns’, impose on the group or community a need to jointly reconstruct and re-conceptualise their work activity. The introduction of new technology stands as a clear example of a situation where new and established rules, plans, schedules or tacitly assumed traditions are brought into question. As a result, a new structure is sought for collective activities through the joint effort of its members who are subject to ongoing co-construction.

The transformation of work

In her seminal work, Zuboff (1988) showed the informative effects of IT. Through informating strategies, people gain an increased awareness of and insight into work. Work organisation also becomes more transparent, and authority can be seen to be redistributed. An informating strategy comprises three interdependent transformation dilemmas, which can be categorised
under the headings of knowledge, authority and technique. Such a perspective aligns closely with the work of Patricia Sachs (1995) and her view on organisational work. Her study aimed to uncover and highlight the complex range of activities, communicative practices, relationships and coordination it takes to accomplish business functions. Such activities are continually mediated by workers and managers (Sachs, 1995, p. 38). An explanation for the complexity of organisational work cannot be found in a purely managerial view, i.e., explicit and procedural, although earlier anthropological studies gave evidence of this. Sachs’ work is based on a legacy of the Hawthorne research (Roethlisberger and Dickson, 1939). This illustrated the contradiction between a formal and informal organisation, which was shown to be evident in all industrial plants. According to Schwartzman (1993), this paved the way for the human relations movement. Sachs gives an elaborate account of the differences in procedural and declarative knowledge in an organisation that uses explicit and tacit views on work.

Sachs’ study is more concerned with work practice than it is with workflow, and more occupied with the role of learning processes in communities than the role of team training programmes (Sachs, 1995). According to Sachs, an activity-oriented view on work analyses everyday work practices with an aim to reveal and explain the ways that people manage and choose to deal with work effectively. It is an approach that acknowledges the tacit elements of work, i.e. the ways that people communicate, think through problems, forge alliances and learn as a way of getting work done. Thus, it is a view which captures whole activities, as opposed to focusing on particular tasks (Sachs, 1995).

The motivating context for Sachs’ work is found in radical technology-oriented change projects in organisations that have been influenced by the strong trend initiated by Hammer and Champy (1993) and their Business Process Reengineering concept (BPR). Sachs’ work finds relevancy today in that we again see a new wave of process-oriented transformation ideas in the public domain. Good examples of these are 24/7 web services, where process-oriented views and approaches are regaining focus and interest. If the earlier wave of computerisation concerned internal flows and the optimisation of value-adding processes, the current wave is more directed towards services. An explicit view acts as a filter towards such services. However, yet again, it focuses attention on procedures and information services, presumably overlooking the practical activities and the conditions under which such services are produced and built. Thus, Sachs’ view and critique still has some bearing, particularly in the context where mobile ICT are introduced into organisational work. In many cases, these technologies are seen to be crucial components in the development of new services and control mechanisms at work. In this situation, however, it is not only a question of new services; we
must also consider workplaces whose configurations are challenged by the practical use of ubiquitous technological solutions.

<table>
<thead>
<tr>
<th>Organisational views</th>
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<tbody>
<tr>
<td><strong>Explicit/Procedural knowledge</strong></td>
<td><strong>Tacit/Declarative knowledge</strong></td>
</tr>
<tr>
<td>Training</td>
<td>Learning</td>
</tr>
<tr>
<td>Tasks</td>
<td>Know-how</td>
</tr>
<tr>
<td>Positions in hierarchies</td>
<td>Informal political systems, network of contacts</td>
</tr>
<tr>
<td>Procedures and techniques</td>
<td>Conceptual understanding</td>
</tr>
<tr>
<td>Work flow</td>
<td>Work practices</td>
</tr>
<tr>
<td>Methods and procedures</td>
<td>Rules of thumb, judgment</td>
</tr>
<tr>
<td>Teams</td>
<td>Communities</td>
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</tbody>
</table>

**Figure 2.2** An activity oriented view on procedural and declarative knowledge according to Sachs (1995), with a focus on learning and learning activities.

With regard to implicit aspects of the workplace and its mechanisms of communication and coordination, an early example and reference can be found in Moran and Anderson’s (1990) design paradigm, the workaday world. This perspective is pre-occupied with how people communicate and interact in a workplace. What Moran and Anderson strived to accomplish was an articulation of a set of patterns that conveyed to designers of the new technology the richness of the settings in which interaction technologies live. More than two decades have passed since their work on the workaday world was published. The critical questions it raises are evidence of its relevance, even though the technological reference at the time was contemporary office multimedia technology, namely video conferencing and audio-augmented awareness functionality. The problem was that the technologies discussed by Moran and Anderson were limited to being used inside a large laboratory. Outside these laboratories, few places could calculate the technologies and conditions offered at Xerox on a broader scale. But their ideas are not limited to any particular technology. The advent of mobile ICT and the way it is used is a crucial and relevant component that has to be added to their perspective. Contemporary mobile ICT mediate interaction through video, sound and text.
in ways that expand the situation at Xerox in 1990. However, the use of mobile ICT is not bound to a laboratory; it is part of everyday life.

**Groups and group interaction**

At work, use situations and social encounters make the workplace something more than a physical location and reference it is a social context work. Small groups are the oldest and most common in all social organisations. The size of a small group generally comprises somewhere between three and 12 individuals. It exists to perform some task within the larger social organisation and is thus delegated a role and responsibility (Fisher, 1974). We find that small groups are temporary teams or groups that have longevity over time. A group differs from the perceived organisational arrangement as a whole because it governs mechanisms and prerequisites differently than a larger organisational arrangement. A group is flexible and is able to quickly adapt to new circumstances. A group is a communication system in its own right. A group, whether large or small, cannot and does not exist without interaction among its members. Group interaction is what holds the shared world of work together and a focus on the group interaction is a way perceiving and capturing the co-production of the workplace (cf. Schegloff, 1982). Here, the social organisation of the vocational practice community is of particular interest and Hymes (1974) offers a comprehensive model that addresses the role of meetings as communication and interaction events in the organisation of work.

Group interaction and the sequences of actions governed by group activities together build a group’s ‘collective’ structure and function. The structure of such a system is explained as the physical arrangement of components making up the system in time, i.e. *tasks, information, routines, regulation mechanisms* and *world view*. Structure and function have their own evolution over time and social interactions in a group inevitably begin or sustain a process of development (Fischer, 1974). The function of a group is thus the relationship between components over time; in other words, how time is managed and coordinated. The degree to which a group owns its ‘autonomy’ is regulated by how much influence the group has on directing their own activities and authority to control aspects, related to how the interdependence of tasks is managed (Bluedorn and Standifer, 2004).
The coordination of components over time is a crucial facet of the control of the complexity of interconnection. How coordination works depends on the extent to which the activities engaged in by the group members are coupled. Coupling itself varies depending on how effectively a group manages to mobilise interaction. Factors of influence are found in the distribution of knowledge and competence within the group, the character of the object of work, and the organisation of planning and articulation work. The flux between a tight and loose degree of coupling varies; it is set according to interaction efficiency. Loosely coupled work could be characterised as work in which people need to be aware of others’ activity and decisions, but without the need for immediate clarification or negotiation (Olson and Teasly, 1996, p. 422). The degree of coupling depends on the degree of communication and interaction and, consequently, a higher degree of interaction would thus in theory build a tighter degree of coupling. Loose coupling often occurs when direct communication is constrained and hindered by a wide range of contextual factors, such as task, distance and so on (Olson and Teasly, 1996). Pinelle and Gutwin (2005) produced a framework that aimed to consider the work of loosely coupled groups. He offers a design model for collaborative systems in this genre. In his studies of mobile collaboration, loosely coupled work patterns allowed the workers to deal with inherent uncertainties in mobile work (Pinelle and Gutwin, 2003). An example of such a ‘pattern’ is illustrated by the observation that the workers in his studies preferred asynchrony to synchrony in direct communication, since it allowed the workers to overcome uncertainty regarding the work schedules of others and their current availability.

A concept that aims to put into words the strategy or even ability that people use when working in groups and deal with this uncertainty is temporal imagination (Bluedorn and Standifer, 2004). It provides an illustrative conceptualisation of how people imagine coordination of different components in a cooperative practice. It addresses the ability of individuals to imagine work as an individual’s, group’s or organisation’s internal timescape and relate this image to other timescapes that affect the situation at hand. Temporal imagination is an aspect of coordination of activities over time. This ability play a crucial role in effective coordination and micro and hyper-coordination of activities in cooperative activities (cf. Schmidt and Simone, 1996; Bardram, 1997; Ling and Yttri, 2003). Temporal imagination is an ability that influences and supports individual decision-making, which serves as a ‘collective mind’ and the shared goals of a group.
<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>CRITERIA</th>
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<tbody>
<tr>
<td><strong>Participants</strong></td>
<td>Describe the participants who interact with each other in a meeting as speaker or sender, hearer or receiver of messages.</td>
</tr>
<tr>
<td><strong>Channels and codes</strong></td>
<td>The channels for communication that may exist in a setting.</td>
</tr>
<tr>
<td><strong>Space and time</strong></td>
<td>The spatial arrangement for the meeting and for the workplace.</td>
</tr>
<tr>
<td><strong>Frame</strong></td>
<td>The process whereby the beginning and ending, as well as the continuation of the meeting, are signalled and marked as an event.</td>
</tr>
<tr>
<td><strong>Meeting talk</strong></td>
<td>Topics and results: the focus of the meeting. Norms of speaking and interaction, development and maintenance of central focus of the meeting. Oratorical genres and styles: specific forms of speech. Interest and participation: the means, sanctions and rewards that may be used to encourage or demand participation at meetings, as well as to maintain interest of involvement.</td>
</tr>
<tr>
<td><strong>Norms of interpretation</strong></td>
<td>Examine the processes that the participants have developed for the interpretation of what happens in a meeting and at other speech events (e.g. chat and stories). These may become important for individuals in making sense of meetings.</td>
</tr>
<tr>
<td><strong>Goals and outcomes</strong></td>
<td>Identify the individual goals that are met in a meeting and the collectively accomplished outcome of a meeting.</td>
</tr>
<tr>
<td><strong>Meeting cycles and patterns</strong></td>
<td>Examine the relationship of meetings to each other and to other types of communication event which are important. These relationships are crucial for understanding the role that meetings play in the production and reproduction of social relations, and cultural beliefs and values</td>
</tr>
</tbody>
</table>

*Figure 2.3.* Hymes’ model of meetings as communication events (1974, pp. 64-66)
Group interaction is established over time and is said to be predisposed by contextual and cultural influences that permeate the workplace (Fisher, 1974). It is argued that what an interaction is ‘about’ and what it ‘means’ is defined in context. It is the thrust, the motive, of an interaction that is put forward and it addresses the ways we acknowledge, inform or signal one another at work through speech, gestures, text and so on. Group interaction nurtures a ‘collective mind’, which a group produces over time. It is a feature of the group that distinguishes between what a group possesses and what individuals do not (Brilhart, 1967). Such a group feature is referred to by Brillhart as \textit{groupness} and it forms the relationships between the members of a group. It also enables the group to function as a perceived entity (Fisher, 1974), serving as the foundation from which the ‘collective mind’ and the shared source of authority of a group can grow. It will naturally shape the kinds of relationships that are established and maintained between group members, and it adheres closely with the degree of autonomy that groups and their members have established. The development of \textit{groupness} is closely connected to the \textit{evolution} of the overall system of which the group is a part. \textit{Groupness} could thus be said to embody the history of a group’s development, which is discussed favourably in terms of the progressive and even possibly regressive changes over time (Fisher, 1974, p. 20). Day-to-day activities are not to be confused with what is discussed here as the historical and developmental dimensions of a group’s development.

However, day-to-day activities form the interaction engine for this evolution and amongst these activities, we find the use of different technologies. It is an ongoing group activity where people manage different spaces of social interactions (Moran and Andersson, 1990). These interational properties relate to how a group is bonded together and how the members manage to effectively maintain balance in their workplace. This balancing work involves the coordination of activities to manage contingencies and practical problems; thus, they learn in and effectively deal with a workplace that is in constant change.

\subsection*{The office and cooperation with computers}

Today, we find different technologies, including mobile devices, messengers and e-mail, all of which mediate large portions of the communication and interaction between people in most work settings. The way in which such interaction pragmatics are enacted in a small group context is a quality of the organisation that is often forgotten about or even neglected when new technology is introduced. Technologies that are replaced might therefore be of particular interest in that these technologies are incorporated in group interaction. Technologies are utilised in the evolution process and in the ongoing changes that their practice naturally undergoes. The use of these tech-
Technologies is a central component in what I propose is a reciprocal relationship between the structure of the particular practice and the function of the group. These two vary locally, of course; however, the latter is less bound to codes and regulations than the former, as it is regulated by legislation or rules. Tools and resources that are used over time might well carry information about the evolution of the setting and local culture within which these technologies are being used. In cooperative work, the social organisations of cooperative practice are, according to Perry (1997), embodied in artefacts. A concrete example is the concept of common information spaces (Bannon and Bødker, 1997).

Schmidt (1991) asserts that the design of technological supports aimed at supporting cooperative practice needs to consider and adapt to coordinative and collaborative dimensions of practice. He asserts that features of coordination are crucial, since they comprise fundamental mechanisms that regulate work practice. These mechanisms help to sustain and regulate collaboration activities, support situations when breakdowns occur and so on. They are also unique for each work practice (Schmidt and Simone, 1996). We find simple examples of such information spaces in paper charts and diaries, which are shared and maintained in cooperative practices. More novel examples can be found in groupware applications, which offer the user shared workspaces and tools for collaboration. The understanding of the common information space in a work practice does not need to be identical among actors, but simply similar enough to co-ordinate their work activities (Reddy et al., 2001). An essential dimension of a common information space is that it is continuously negotiated and maintained by the participants of the work practice (Bannon and Bødker, 1997). It evolves and is transformed through this process and alongside the development of the work practice itself. As a result, it also conveys an historical account, not only of unfolding events, but of the developmental dimension of practice.

Computers have been used in cooperative collaboration for some years now, although these are typically synchronous multi-user computer systems (Dourish, 1995; Drury, 2001), where the computer is used as a tool to perform a cooperative or collaborative task. The most common objective is the delivery of groupware functionality (e.g. Pinell and Gutwin, 2002). The role of the computer in co-located settings is, on the other hand, discussed in terms of sharing displays among collaborators or in terms of embedding computer power in the texture of the physical environment. It is however worthwhile to consider what some familiar configurations of computer technology offer a co-located group, working together in collaborative activities.
Figure 2.4. Different modes of cooperation and involvement of ICT.
Moran and Anderson directed their attention to the use of multimedia technologies in a traditional office environment. A traditional office imposes an individual perspective of how a specific computer is supposed to be operated. This view can be especially troublesome when practices that are traditionally collective are about to get support through computers. Technology is often introduced into the workplace for the sole or primary purpose of efficiency or productivity gains. What is often ignored are the normalised peripheral interactions between group members which exist prior to the introduction of the technology. These peripheral interactions can be changed or lost at a time when the focus is on the implementation of a more efficient, technological solution for the core process. In figure 2.3, six common physical configurations of IT-supported human-human collaboration are represented. Early research into the physical set-up between a user and the computer was focused on a single user working with a single computer that interacts with local computer applications. No other people are synchronously involved, either locally or remotely. If the user is set to accomplish a task with others, the user could be as shown in configuration 2 in figure 2.3 above. Here, the user interacts with the computer and other people, but has sole control of the technology. Later, as exemplified by configuration three, with the introduction of distributed computing, networked models were added. However, each user’s interaction was still with a single, unshared computer on that network. These use situations are fairly well understood both from within research and industry.

More recently, these ideas have been extended in HCI and CSCW research to include shared display (such as in configurations 2 and 4). For example, Hawkey et al. (2005) demonstrate how a large and shared display extends the user context, including two or more collaborators at the same time. However, it is the fifth and sixth configurations that are of relevance for this work. They are concerned with two completely different situations and uses of technologies. What is shown in the fifth configuration is a small group that interacts through mobile ICT. They share the overall task but individually undertake the subtasks in a dispersed geographical area. In the sixth configuration, it is shown that technology is provided for a co-located group, but only one or two members of that group use the artefact. Each of the configurations requires the participants to interact in different ways and is led by a combination of spatial factors (Steinzor, 1949) and technology support.

**Distributed collaborative work**

A central term in distributed collaborative work is awareness. It is a dimension that has been given a lot of thought in HCI- and CSCW-oriented research. Here we find two orientations of focus. One orientation concerns the design and construction of interfaces and the attentional cues that a sys-
tem should offer a person. These could include sound, pictures or animation, which provide people with different kinds of information and make use of the system more efficiently or with even more versatility. The scope of that focus, and any possibilities within this scope, are endless. Awareness, in all its varieties, is a well-known and much-discussed concept in HCI and CSCW research; as such, it is a core concept for ambient displays (Ishi et al., 1998; Rønby, 1997), media spaces (Dourish and Bly, 1992; Watts and Dubois, 2001), video conferencing (Vertegal; 1997; Daly-Jones et al., 1998), and shared-workspace technologies (Gutwin et al., 1996; Ishi et al., 1993). However, it represents something of a moving target in the field; it is an “elastic” concept, which constantly threatens to slip through the fingers of designers who wish to support it (Schmidt, 2001). The other focus is directed towards people and how we use different ways to make each other and ourselves aware of the world around us. The aim here is closely related to the first orientation, as this focus is aimed at providing informed suggestions of possible features, which deal with an awareness aspect in the performance of a specific task or procedure. The latter focus puts attention on practice and the things that people do in collaborative settings. Heath et al (2001) stress the need to examine awareness and take the domain seriously in order to provide enough guidance and knowledge to build collaborative systems aimed at supporting the collaboration of distributed individuals (p. 345). Mobile ICT utilised as components in collaborative systems bring a new dimension to the problem.

Moran and Anderson (1990) see people’s degree of engagement as an essential social mechanism of group interaction. It usually starts with a person entering the office: her entrance is noticed and a greeting is given and reciprocated; they engage in a brief chat over a cup of coffee about yesterday’s football or cricket; suddenly, after a half an hour they find themselves engaged in a deep conversation. Most of us will recognise ourselves in such a situation. It is a situation that Moran and Anderson (1990) view at different points on a spectrum spanning from awareness to co-presence to conversation (p. 388). It is reasonable to treat engagement as that which follows a multidimensional problem, in that we can be aware, co-present and converse in so many different ways (Moran and Andersson, 1990). Moran and Anderson (1990) suggest that an approach which takes into account the relationship between awareness and work activities is important for the introduction of cooperative technology. They place fluidity of action at the centre of the problem, asserting that collaborative practices inherently rely on a keen sense of who is around and what is going on when they are needed:

“[it is] how people slide to and fro between the formal and informal in doing the things they do within the daily round of work. This fluidity is a fundamental feature of work activity, and we need to be attuned to how technolo-
gies of various kinds can play a role here...” (Moran and Anderson, 1990, p. 386).

A few pages earlier we find awareness addressed more directly:

“...people are very aware of what goes on in their environment; without such awareness they would feel isolated...the environment needs to signal the availability of these things by tapping on people’s ability to peripherally process the non-attended parts of the environment so that they can redirect their attention when appropriate...” (Moran and Anderson, 1990, p. 382).

Moran and Anderson were addressing work activity in office environments. Fluidity of action takes on a new significance with the loss of collaborators’ attentional cues and the loosening of environmental bonds inherent in mobile work. It is important to address the challenge of moving away from the prevailing notion of office work as a norm when exploring awareness. That is not to say that office work is less important than mobile work, as is evident in the studies reported by Belloti and Bly (1996), which focus on local mobility within the office. The usual interpretation of awareness in the context of collaborative systems is often associated with features that offer activity-oriented information to the person using a system. Such information could include who is currently online by means of a contact list or flashing icons to attract the person’s attention. Most social network-oriented applications, such as MSN, Skype, Facebook and many others, use such cues. Mark (2001) offers another perspective on this matter, which extends the view addressed by Belloti and Bly a little further. It is not a conventional view; the proactive behaviour that informs or asks colleagues has a normative effect on workplace conventions. She proposes the idea that awareness is a learning device, which could adapt to the ongoing development of the workplace activity. In a similar vein, Heath et al. (2001) discuss the potential for providing the person using the system with automatically revealed awareness information. People using the system could be provided with tools that allow people to selectively and continuously generate traces of activities and actions that are visible to others in different ways.

Mobility is a dimension in which awareness plays a focal role, as is clearly demonstrated by recent work exploring mobility and mobile work. Sherry and Salvador (2001) describes the use of mobile devices to support mobile work as something akin to jazz-like improvisation, where the work performed owes to a constant interplay between unplanned and planned activities. In her study of mobile workers, Churchill (2001) crystallises access of information and access of others as core elements of mobile collaborative practice; both are aspects of potential awareness. Laurier (2001) puts forward the idea that awareness given through the use of mobiles makes it possible to reconfigure spaces so that they are made suitable for work activities.
Wielenmann’s (2003) analysis of shared technology has led to a conception of the awareness of others that is focused on the need to negotiate the context or frame within which the collaborators act. Most of these studies concern mobile workers who are engaged in collaborative activities that occur in office environments or result in the joint production of documents. Whether working as consultants, sale representatives or engineers, the nature of their work is ingrained within “the office”. Notice however that these studies do not concern intense cooperation and collaboration. Mobile ICT actually give people the means to handle collaboration at a distance; they thus promote individual work. Belotti and Bly (1996) showed that office workers engaged in a kind of “social browsing”, strolling around, chatting and picking up crucial information that was needed in order to take decisions in their own individually delegated work. Wiberg (2001) and Orr (1996) similarly address loosely coupled collaboration, where individuals worked as one, jointly establishing support for similar aspects of awareness in meeting places, found in restaurants and cafés or local offices. These locations played a crucial role in the workers’ strategies for establishing social interaction, and exchanging experiences and troubleshooting stories. Paying attention to how people make each other aware, focusing on the awareness aspects of work practices has a promising potential to guide not only design towards feasible solutions, but also support a practice-oriented understanding of cooperative and distributed work practice.

A Work Ecological view on ICT-based Practice Support

When technologies are introduced in work ecologies and social practice, people who engage in an activity are somehow induced or obligated to organise their actions in a way that can be ‘parsed’ with respect to a grammar (Agre, 2001). Agre focuses on the development of ubiquitous and context-aware technologies, to which mobile ICT belong. He argues that the use of these technologies can be explained in terms of the interplay between the dimensions of architecture, practices and institutions (Agre, 2001). Agre points out the difficulty in modelling these systems without considering the surrounding context and the space for possible user actions. The interplay between these facets challenges general conventions of system design, which according to Agre follow a particular sequence (1994). That sequence produces systems, which follow a certain predetermined grammar. A grammar represents all of the necessary and institutionally permitted sequences of actions. It provides a script that in the end is generic and suits a wide array of application areas, satisfying both the developer and the customer. System procurements thus depend on a rationale for their deployment, which crystallises the long-term goal of what is to be achieved. This rationale is inscribed on the design of the system; thus, it generally prescribes the work
tasks in which they are intended to be used. The ‘intended or anticipated notion of use’ or to use Agre’s term, the grammar that is induced and obligated to organise the collective action, is here treated as a structure which will make the habitual and routine visible. The question is, though, how flexible is such a solution and how does it support the development of systems that incorporate new and interactive technologies? Berg (1997) offers a related argument. He talks about the importance of understanding what he calls the ‘inner-logic’ of a deployed technological support, hence understanding the potential ways it transforms practices and territories.

In a similar vein Orre and Hedestig (2004) take up Malone’s (2001) idea on semi-formal systems, Brown and Duguid (1991), and Wenger’s communities of practice (1998; 2003) in their approach addressing the issues and challenges that the use of mobile ICT produce for design and use of ICT in cooperative activities. They start of by contending that the use of mobile ICT is nowadays almost an inescapable component of everyday life and their take on the idea has a strong practice orientation following the assumption that people in organisations configure themselves with others during the course of their work. This is an aspect that was clearly illustrated by Orr (1996; 2006). He showed what, at first glance, seemed to be individual work and problem solving, but was transformed into being a concern for whole groups through an exchange of experiences in narratives, e.g. war stories (ibid). These took place in face-to-face informal meetings where advice was sought and reciprocated. It was a social organisation which sat alongside formal structures and corporate training programmes. Following this line of reasoning, work practice and learning within groups and communities cannot be described as something that are predestined in “task forces” but in terms of the formation of emergent communities (Brown and Duguid, 1991). Brown and Duguid (ibid) asserted that a focus on groups as task-forces does not provide any clear ideas of how work or learning is organised or accomplished, since it will only reflect dominant conjectures of the organisational core. Instead, they denote the formed groups as ‘communities of interpretation’, where members jointly produced tentative solutions for complex tasks and constructed a true sense of identity through the membership and a joint construction of a shared world view took place. People work and learn collaboratively; the level and degree varies with the task but, in the course of these interpersonal configurations, interstitial communities are continually being framed (Brown and Duguid, 1991). Sellen and Harper (2001) add to the discussion on communities of practice showing the tight relationship between interactional affordances and features of artefacts communities build also create complex information ecologies of work In their work, communities of practice represent the informal human networks of information exchange and collaboration, which help individuals know what their colleagues
are doing and enable them to collaborate and engage in teamwork (p. 190). A modest goal when implementing novel technology is to retain the natural processes and activities found within such practice communities.

A first example where ideas on this particular theme that focuses on these group and community processes is implemented that also materialised in a technological practice support, are found in Prinz and Kolvenbach (1996) and their work with a workflow system in a ministerial organisation. Here, they elaborate on the idea that a CSCW system should be flexible and easy to modify. In this case, the system deals with coordination activities within the organisation. Moreover, let us see how they have interpreted the complex web of interaction within groups. Their technological solution is firstly focused on workflow processes and procedure. The communication which adhers to the coordination activity is provided by a highly sophisticated video-conference system. It could be argued that this interpretation of communication coordination is problematic when we consider a technological support that is aimed to support both informal and formal communication. An example that adheres to this aim, is given in the simple reason that videoconferencing is not a common choice within groups. A videoconference solution depends on established rules and norms, which deal with how communication will be engaged. This approach fails to address how informal and formal dimensions of communication should be treated with relation to how groups work.

Another example is found in Millen and Fontaine (2003), who discuss how to improve individual and organisational performance through communities of practice. Their starting point is work-based communities and they refer to Orr’s statements that most informal discussions take place as part of natural social interaction, for instance during meals and coffee breaks (Orr, 1996). This assumption is further elaborated by the statement that work-based communities use groupware to enhance traditional face-to-face interaction and to reach co-located and distributed workers. They state that increased participation in work-based communities is interrelated with increased resource use, i.e. information and content. Their solution is simply to put more content resources into the system. Even though they deal with a similar problem in their investigation of collaborative processes to that found in Hedestig and Orre (2004), I find their discussion and conclusions constrained by a too simplistic view of the group process. They consequently disregard the social dimension of groups, focussing instead on content and structures. In addition to this, by following Wenger’s line of thought, they only include the concept of reification found in his model of how people negotiate meanings in community of practices. According to Wenger (1998), reification is concerned with the organisational part of meaning building, which is connected to the production of objects that set our experience into
“thingness”. The second dimension of meaning building, participation, is thereby lost. In Wenger’s terminology (1998; 2003), participation is connected to personal and social involvement with others. It reflects “a complex process that combines doing, talking, thinking, feeling, and belonging” (1998, p. 56).

A third example is taken from De Michelis (1996), who approached the design of collaborative systems that concentrate on participation by focussing on the complexity of cooperative processes. His approach is heavily influenced by the community of practice and activity-oriented viewpoints. In earlier efforts, De Michelis’ attention was focussed on the web of social relationships, in this case within the scope of cooperative processes. His argument is that these processes cannot be “reduced to any functional and/or hierarchical model” (p. 42). In his analysis of cooperative processes, he generates a number of key concepts that are important for CSCW systems and how we deal with the interpretation of the social context. De Michelis discusses four technological features of CSCW design that consider the social context (Agostini et al., 1997).

- The first feature considers the openness of the system, which follows a discussion that is based on Lave and Wengers’ concept of central and peripheral participation within a community (Lave and Wenger, 1991). According to this, a technological system should be flexible and enable people to easily get a feel for the structure of the social organisation of the activity, which the technological system aims to support. The system should allow both a low and high level of involvement. Involvement relates to shared goals and motives that govern and regulate the membership of the group or community. The system should therefore adapt to a wide array of user behaviours governed by the cooperative process.

- The second feature deals with multimedia continuity, which addresses the importance of people being able to choose between various communication channels in their communication with the group and community members. Cooperative work is distributed in time and space. Depending on the task, synchronous and asynchronous communication can be used. Among these, public or more private and enclosed channels should be made available to the users or possible to incorporate. The influence of hierarchy and power relationships that belong to the work and learning context should not lead to discrimination in the choice of communication channel.

- The third feature concerns contextualisation. This emphasises that the system should regard the cooperative process as a history of mutually related communication and action events. Cooperative practices continuously generate a trace of all events and actions towards the accomplish-
ment of tasks and activities. Such threads of history find a multitude of implementation alternatives; these depend heavily on the activity and traces left behind. They can include shared and jointly produced documents.

- The final feature addresses the importance of integrating communication and action flows. It is argued that these flows define the basic units of cooperative work, namely conversations and workflows. If the latter concerns the sequence of the process, either planned or created step by step, the former address the conversations surrounding the accomplishment of the sequence of unfolding activity. Communication and action flows are thus mutually dependent; they are an important feature, providing awareness of the status and result of ongoing activities.

These features follow the characteristics and the dynamics of the community of practice and the perspective it offers on work and learning within groups. One could question here how these features have materialised in the technological artefact which is given as an example by De Michelis (1996). The description of the MILANO system shows that they failed to capture some of the key aspects of their own requirements. Firstly, many of the technical solutions were concerned with information and content. It was thus an 'information driven system' and, as a result, it failed to consider the complexity of communication between members in a cooperative process. By being information driven, I mean that too much emphasis is placed on content, and less attention is placed on providing feasible and adaptable features that can support and sustain interaction and communication within the group. This is also evident in the two other examples given above. Secondly, the MILANO system provided the user with a structure which was too formal, i.e., the automation of processes, structures and procedures within the system. The degree to which a system is closed or open is of great importance. Following the former approach, the system easily turns into a closed technological support where features constrain a user’s space of possible action. The problems associated with such a situation are that people have a higher threshold to climb when they start to use it, due to the fact that it is difficult to abandon established routines in favour of something that just seems too complicated and which interrupts work activities rather than supports them. Taking this into account, it is a discussion which motivates an open support system solution more than it favours a closed system. If crucial aspects of practice is to be supported by ICT, it has to allow its’ users to view, combine and use other technologies which inescapably will imply a configuration of the features of the system and it seems being a promising way to walk addressing the complexity in a work ecology, not only from a traditional design perspective, but also as a support to unravel the complexities of a work practice and its configurations of technologies.

32
Studying Assimilation Processes in Home Care

Studies which explore home care tend to concentrate on the skills associated with care work and development of care work (cf. Szebehely, 1995; 2001; 2003), rather than use of new technologies. Home care is dependent on the skills of people who care for the well being of others and provide qualitative care. When ICT now is introduced as a crucial component of contemporary care work and its future development, it will inescapably also be crucial component in home care practice. In this thesis, the observation of care assistants’ practical use of technology is the main data source chosen to gain an understanding of the social organisation of the workplace. In work by Star (2002) and Orr (1996), and more recently (Orr, 2006), good reasons are given for the observation of work and the practical use of technology. Schwartzman (1993) draws on the methodological implications that followed the famous Hawthorne studies (Roethlisberger and Dickson, 1939; 1966), to contend that researchers should not only rely on the employment of interview or counsellor techniques. Rather, observational skills and techniques of ethnographic and qualitative methods in the study of organisations (p. 17) provide insight into interpretative accounts of the studied reality (Agar, 1986). This study is placed within a research tradition where social and technological dimensions are equally important. The social organisation of work is intertwined with the use of support systems; the use of technology is, in turn, dependent on how the social setting is organised. Taking on a focus which aims to unravel technology assimilation processes. They have to be understood together if we are to understand the change, effects and future challenges addressed by the use of technology in home care,
This study is ethnographically informed. I have used a multitude of different data sources, which contrast my own view and the views given by the people I have studied. The study is also longitudinal; it commenced in 2001 and ended during 2006. This chapter presents the method I have used and the choices I have made in the research process, which produce the interpretative account presented in the coming chapters. In the remainder of this chapter, I first, briefly, present the three home care settings which make up this study. Thereafter, I describe and discuss the method and my approach to studying the home care context. Finally, I present how I have dealt with the analysis and presentation of the collected data.

**Workplace studies**

Studying the workplace is one of the approaches that have emerged as a central strand of research that deals with how the ecosystems of different technologies can be approached (Crabtree et al, 2001; Luff et al., 2000; Luff and Heath, 1998; Mantovani, 1996; Suchman, 1995; Suchman and Wynn, 1984). Workplace studies continue to play an important role in CSCW, even though the conception of “workplace studies” now tends to include a much broader scope of studied activities (cf. Crabtree and Rodden, 2008). In the beginning they were a response to a situation in which most information technology was designed too narrowly, with an individual user in mind. Today, workplace studies have the potential to provide answers to a similar problem. However, it is not the technology that is too narrowly designed; rather, the conceptions and ideas about use are a more critical problem (cf. Sellen et al, 2009).

Schmidt (2000) sees a workplace study as having two distinct roles in CSCW. Firstly, workplace studies take on the role of a requirements analysis method. If we approach a work practice with an aim to generate a set of requirements, we have to presume that the technology, the digital material we will give form and shape, is known to us. Using such an approach presumes that the technology or set of technologies are mature (Schmidt, 2000). Mobile technology is, in some ways, a mature technology; for example, when we use it for our own personal use. However, when it is about to be integrated with other technologies in a systematised way, it is not a mature technology. Therefore, one can say that mobile technology has become a normal part of everyday life. It is ready to hand. We do not even need to think whether we should use the phone in particular situations, we just do. We invest little thought into why we use it. For many of us, mobile technology is seen as having a high level of transparency. In a way, though, this is a sort of fallacy, one which distracts us from looking at other options that might be available when integrating mobile technology with other digital technologies. Another perspective is that the technological infrastructure into which mobile ICT is
integrated is designed from an individual-use point of view; therefore, it does not provide a foundation and functionality with which to facilitate support for cooperative practices (Schmidt, 2000).

The second role of workplace studies referred to by Schmidt relates to them as a contributor to the conceptual foundation for CSCW. Thus, they also contribute to the development of CSCW technologies (Schmidt, 2000, p.142). He points out that gaining an understanding of the accomplishment of orderliness in a workplace is a crucial step towards an understanding of what in practical work activities could and might be supported by technology. This particular stance corresponds well to the view of workplace studies adopted in this thesis. It also aligns well with how this work has developed (cf. Orre and Watts, 2006). Schmidt (2000) sees workplace studies as playing a role in the dismantling of common sense conceptions of cooperative work - taking them apart, unpacking and disclosing the hidden practices of articulation work (Suchman, 1995; Schmidt and Simone, 1996). Thus, they give access, both analytically and conceptually, to the intricate ways and means of the production of social order in a cooperative practice (p. 145). Consequentially, workplace research will not only produce an account of the role that people give to mobile devices in the ways they choose to involve it, it will also produce a model of the context, as well as its activities and potential contingencies. Such a model would have a promising potential to guide design and development activities. The experience we bring from earlier workplace studies is that artefacts in a workplace rest on a complex social organisation of objects and practices, which is strike accord with the challenges entangled with understanding the complexity of new ecosystems of technologies, and the results of interacting with them (Sellen et al, 2009).

A strategy for constructing the fieldwork

The study comprise a collection of workplace studies which commenced in 2001 and ended in 2006. Hughes et al (1994) and Rogers and Bellotti’s (1997) ‘reflective framework’ for ethnographic studies offered a first meet with the observation as a resource in system design and evaluation. Ethnography (Schwartzman, 1993; Hammersly and Atkinson, 1995) as it is used here do not follow fully fledged anthropological and ethnographic research programme; a more appropriate classification would be an ethnographically informed case study. The incremental approach that was adopted is in accordance with established ideas on the design and development of interactive systems and collaborative systems (Benyon et al., 2005; Crabtree, 2003). The approach is also influenced, not only by the work discussed in the previous chapter, but also by the writings of Agar (1986), Bourdieu (1972), Clifford (1997), Gemzöe (2004) and Hannerz (2001). Other influencing activities has been the parallel field study and research activities focusing on mobile
ICT and decentralised education (Orre et al, 2001; Hedestig et al, 2002; Hedestig and Orre, 2003; Hedestig and Orre, 2004; Danielsson et al, 2004), which naturally guided the workplace studies in home care.

**Participant observation**

Participant observation (DeWalt and DeWalt, 2002; Patton, 2003) comprises an array of appropriate techniques and is more of a strategy than a complete research programme (Wolcott, 1995). The extent to which the researcher immerses himself or herself in the social practice under study significantly differs between participant observation and other qualitative approaches. Participant observation is what distinguishes an ethnographic research programme from a case study; the latter usually capitalises on in-depth interviews and additive document sources (Myers, 1999). The multitude of combinable techniques makes participant observation unique and challenging, to the extent that academics are reluctant to use it in their research (Wolcott, 1995). It is a strategy which requires the researcher to get involved in the situation and socialise.

By engaging in participant observation, I have, without doubt, become involved in situations which are important to the socialisation process. Patton (2003) supports this experience, asserting that the data retrieved and collected through participant observation offers a first-hand account of the setting. This allowed me to be open, discovery-oriented and inductive. In the field, I observe while participating and, naturally, strategies are needed to maintain the relevance of data. A flexible and open attitude is supported by a semi-structured plan for the day, which is derived from earlier observations and writings. The interpretative account does not need to rely on earlier conceptualisations of the setting. I would say that familiarity does not necessarily support quality of observation. Overfamiliarity might well be disadvantageous, in that aspects which should be visible are hidden due to negligence and inattentiveness. This is an outsider’s prerogative. I have, of course, read and learned about home care and the use of mobile ICT through other sources. However, participant observation is an approach which aims, from a holistic perspective, to support the work that frames a social context. In my work, I was often given a position from which to observe events which routinely seemed to escape the awareness of those who were native to the setting and earlier conceptualisations.

The objectives which motivate the observation need, however, to be clear and articulated beforehand; if not, the degree of access and trust will be affected negatively. The application of participant observation is not, in itself, a trivial approach. In this work, I have imagined potential situations and juggled a couple of observational threads simultaneously to be prepared and
This strategy provides a loose support structure. However, it has to be used wisely to avoid observing activities too narrowly or, even worse, miss important facets of practice due to a too rigorous preparation. Rogers and Bellotti (1997, p. 62) offer a set of questions problematising existing settings which are listed below. These together with the orientation of view Activity Checklist (Kaptelinin et al, 1999; Kaptelinin and Nardi; 1997) offers provided a work structure in the initial phases of the fieldwork. These questions are also remainders and food for thoughts for any of the different stages of the field activities. They have kept me on my toes supporting the crucial work valuing the observations and supporting the early stages of the analysis. The questions are:

- Why is an observation about a work practice or other activity striking?
- What are the pros and cons of the existing ways technologies are used in the setting?
- How have “workarounds” evolved and how effective are they?
- Why do certain old-fashioned practices, using seemingly antiquated technologies persist, despite there being available more advanced technologies in the setting?

The advantage of an ethnographically inspired approach is its flexibility and openness to the unexpected. Furthermore, as it is almost impossible to decide beforehand on the exact plan for a particular day in the field it is also a risk that the fieldwork loose its focus. The role of the questions pertain the possibility being flexible, at the same time as focus is retained. I strongly believe that the ability to adjust, and be flexible and open to the unexpected, is more important than any other strategy. This is not to say that anything goes and that all situations one finds oneself in are relevant to the objective of the research programme. A particular strength and, at the same time, a weakness of the approach is that it quite quickly became person dependent. The upside of participant observation is that when the first formal phase of analysis is on the table, the researcher has the advantage of using personal knowledge as a resource (Patton, 2003). However, there is a risk that the researcher’s feelings and impressions could influence any views and perspectives taken. These aspects are as important as anything else in this process. All field data is permeated by a researcher’s instincts. Their impressions and feelings, in part, find their way into the most detailed field notes and accounts (Patton, 2003).
The research settings

Three home care settings are studied in this work. In the text, these organisations are referred to as Alpha, Beta and Gamma. In all three settings, I studied the work and activities taking place in different workgroups focusing on how the care assistants in these workgroups used various sets and combinations of technologies in everyday work activities.

The study initiated in one particular Alpha workgroup was, to my knowledge, the first Swedish pilot study of the use of mobile ICT in home care work. Other workgroups in Alpha were involved in the later stages of the study. Alpha’s main home care office is located in a municipality that comprises two main but smaller communities. About 15 people work at the first site and 20 people work at the second site. In the former, there is one work group, whilst at the second site in, there are four home care workgroups. It is the former of these in total five workgroup. Alpha operates over a vast geographical district. Although the municipality itself is small, the area it administers is large. The care assistants walk or use bicycles to visit the elderly whose homes are centrally located. However, the care assistants mostly use cars to effectively manage transport. During the autumn and winter, they cannot do without them.

Beta, which only consists of one workgroup, is another organisation which adopted mobile ICT early on. Beta is based in a local district of a larger city. The district that Beta is responsible for is not as geographically dispersed as is the case for Alpha and Gamma. Most clients live within walking distance and care assistants only use bicycles if needed. Beta operates in an area where residents are culturally and nationally diverse. This diversity is also reflected in the workgroup and influences the work culture in Beta.

Gamma operates in the municipality which covers a wide geographical area and has almost 115,000 residents. Gamma has 280 employees, organised in four local service areas: northern, southern, eastern and western areas of the municipality. In turn, these areas are divided into several small local districts. There are also a growing number of private vendors which offer home care services. These are not part of this study. In Gamma, six local districts were studied in more detail. Gamma have similar situation as Alpha concerning transports. The care assistants walk or use bicycles to visit the elderly whose homes are centrally located. However, the care assistants mostly use cars to effectively manage transport. During the autumn and winter, they cannot do without them.

1 Pictures of the different meeting locales in Alpha, Beta and Gamma is found in the Appendix, Figure A.1., A.2, and A.3.
The general services offered in these different organisations which comply with most home care organisations are:

- **Personal care.** This involves assisting elderly people with breakfast, dressing, showering, walks and social time. The departments in Beta and Alpha also have a well-established cooperative relationship with the local primary care unit. This means that care assistants are delegated tasks and duties by the district nurse. It is a win-win joint venture. The personnel are given motivating tasks and the primary care unit has reduced the quantity of unnecessary phone calls from anxious patients. The primary care unit can therefore focus more on those patients who really need medical care, since the home care work groups function as a filter and communication link to the patient and at the same time be informed about the condition of the others.

- **Personal alarm service.** A safety alarm can be installed in the homes of the elderly through their own telephone connection. This is connected to the home care department during working hours and a 24/7 centrally monitored alarm. In Gamma and Beta each safety alarm is connected to a special work unit which has responsibility for the 24/7 service,

- **Cleaning, grocery shopping, and distribution of lunch and dinner boxes.** This service was delegated to other service providers the last two years of this study. Before this change, however, the menus, and lunch and dinner orders were managed on a weekly basis by the home care department and the care assistants in the workgroups.

**Technological support for a small group district**

Although the main ICT systems considered in this study are both simple and straightforward, they nevertheless do have some complexity. I will not go into detail regarding the total functionality of these systems, but their main character and functionality will be part of the coming chapters. I also intentionally move the focus of this study from computers and systems, to the usage and role of these systems within the social organisation of work activities. Alpha and Beta share in common a bottom-up oriented view of utilising a support system for documentation and work scheduling. In Alpha and Beta, all workgroups use Joliv Mobile Care, which is a complete integrated system for home care administration and home care fieldwork. Gamma represents an organisation which followed a more traditional approach. It is also an organisation that, early on, adopted ICT as an essential tool in social work administrative routines. The combination of ICT and home care is relatively new. Early initiatives were taken in the late 1990s and Gamma was one of a few organisations which, early on, chose to use ICT for documentation in home care. In contrast to Alpha and Beta, I learned that
Gamma utilise a top-down oriented view in their work with ICT. In Gamma, a number of different systems are used. The two of concern for this thesis are Trygghet, Effektivitet och Säkerhet (TES) and Vård och Omsorg (VO). The former is an effective planning and scheduling system. The latter is a care administrative system used by Gamma over a long period of time. Gamma have invested a lot of resources into integrating these different systems. Mobile ICT is only tested in pilot projects with an aim to find functional solutions for full-scale implementation. Gamma was fairly late with their implementation of a new scheduling system and integrated mobile ICT. The pilot project that is part of this study involved the software application PocketVO, a mobile application for handheld computers that is an integration of TES and VO. There was yet another device used in Gamma at the time, TES Dosan, a small digital device which remotely communicates with TES through the personal alarm system installed in the home of each elderly person.

Figure 3.6. The two interfaces of JOliv Mobile care.

In Alpha, Beta and Gamma, the desktop application has two main roles. First, it supports the production of work schedules. Second, it supports the documentation of activities. Information is centrally stored and accessed by all the local home care groups in the organisation. The main features are:

- Articulation and planning of work
- Documentation and distribution of client information in the workplace
- Report generation
- Notes and messages about the clients in case divergence
These systems also share a common feature in the way that a mobile application is used to distribute information, work schedules and documenting features. In the early pilot studies, the mobile device was a handheld computer or a PDA. By the end of this study, the handheld computer had been replaced by a device which has all the functionality of the existing unit, plus those of a mobile phone. The development of these technologies moves quickly. This can be an advantage. However, it is also costly to reinvest in new devices. The mobile devices are in all cases updated and synchronised by a asynchronous connection through a docking cradle (Alpha, Beta and Gamma) or by a GPRS connection (Gamma).

**Observing usage of technology**

Technologies are repurposed and incorporated into the way in which a practice develops (Yanow, 2005). Since new technologies are part of these settings, they are also implicated in and subject to this reconfiguring and repurposing (Dourish, 2003, p. 466). Tools are thus adapted or customised as a user makes an explicit reconfiguration of the technology in order to suit local needs (Dourish, 2003; p. 467). By focussing on practical involvement as an ongoing activity, it is possible to determine the ways that technologies are learned, selected and appropriated in the workplace. In this process, technical problems or breakdowns in practice that occur while implementing technology are an important source of data. Nilsson (2006) addresses such situations and denotes them as ‘critical situations’, which force the involved parties to come to a halt. These are situations where the structure of practice and technology breaks the surface for a short moment. Circumstances such as these have a promising potential to reveal crucial information about factors and aspects of how technology finds its way into cooperative activity in practical work; thus, breakdowns are vehicles for understanding assimilation processes.

Of particular interest were breakdowns that belonged to the interaction and communication within the workgroups, and which were informed by an interaction-oriented perspective (cf. Moran and Anderson, 1990). Here,

- I studied the morning meetings carefully.
- I studied the care assistants’ work in the field with a clear aim to uncover how they used different technologies.
- I studied how the care assistants communicated and interacted and what this interaction involved.

I learned that cooperative practice in home care work could not be observed in one specific locale. The distributed character makes such a project impossible. In support of this work, I found guidance in Marcus’ (1995)
group of simple strategies, which were developed to support and guide the construction of multi-sited ethnographies (see also Clifford, 1997; and Han-nerz, 2001). The first strategy, one which I perhaps have used the most, is to follow the people. The second is to follow the things, which in many cases in this study complies with the previous strategy. The third strategy requires one to follow the metaphor; a network for instance is another common way of organising business and work. The fourth, and final strategy is to follow the plot, a story or allegory. I associate this strategy with, for instance, a care case or a trial, which comprises both a sequence of actions and a chain of activities which can be followed and understood by the researcher. What is offered is a conceptual idea of how to approach the home care context using strategies that belong to multi-sited ethnography, as well as the difficulties that such an approach tries to overcome (Marcus, 1995; Hannerz, 2001).

Marcus (1995) asserts that we are in need of new approaches to understanding the interlinked cultures and lives that are developed between traditional and new establishments. In a networked society, a vast number of people, goods and commodities cross borders. Communication is enhanced and accessible at high speeds and low rates. To follow a thing might involve following a piece of technology or information. Mobile devices and information travel in a similar way in an organisational context, as they cross national borders. In his studies of organisational management of information in the IMF, Harper (2000) gives such an example; here, the strategy revealed a more realistic account of how information was communicated in comparison with how the formalised information network was thought to function.

Similar strategies, although more concrete and practical in nature, are discussed and applied in Weilenmann’s (2003) studies of mobility. She identifies fours strategies through which one can examine mobile interaction and mobility. The first is to follow the actors, which involves following people as they go about their business and recording what they do. The second strategy is to follow the technology, which means that we follow the people as they go about their business, paying particular attention when a specific piece of technology is used. These two strategies seem very similar in focus. However, the latter narrows the focus of the observation. It supports the identification of situations where the use of technology is found to be appropriate or inap-propriate. There is also an opportunity to identify situations where an ex-pected use situation does not occur. To follow the technology wherever it takes the researcher thus emphasises the mobility of both the user and the technology.

Weilenmann (2003) used two strategies which are similar in outlook. The first one is to study a place and the second, to study the virtual communication space. These two strategies address the inherent difficulty of studying
mobile ICT use. The use of these technologies could take place anywhere in the workplace. A comprehensive just-in-time view of an event associated with a particular use situation is, therefore, impossible when studying people who work in different places, within a larger and ‘shared’ setting. One can only be in one place at a time. For example, when someone telephoned the person I was with, the only thing that I could do was to ask who had called and get a ‘second hand view’ of why the other person had made contact. These dimensions, namely the study of place and virtual communication space, had a great influence on this study. I have complemented and followed up observations with discussions and one-to-one interviews or by initiating a group discussion. Written material was also used to initiate discussions in a similar way. Both official and unofficial documents were used. Audio recordings were transcribed and video recordings catalogued.

Home care work is a care-related task that may appear as mundane and lacking in complexity. The work which is carried out in an elderly person’s home is a mix of care activities and traditional household activities. Getting involved was part of my method. This is not only an easy way to learn more about the activities under study, but also helps to build trust and confidence in my role as a researcher with the people that allowed me to study their work and experience their attitudes and ideas. The work tasks in which I engaged relate to easier assignments, such as making breakfast, cleaning, vacuuming, being social, making coffee and so on. Active involvement generates things to talk about, which not only makes the research work more socially enjoyable, but also offers promising potential for views on work and technology to be aired; other methods may not offer such opportunities. There were, however, tasks which I did not engage in, such as situations relating to assistance in morning toilet and shower routines. I do not have adequate training and felt that I would put the elderly person and myself at risk.

**Documents, diaries, video and photographs**

It may be the case that an effective home care office is an empty office. As little time as possible should be spent in there. Time is supposed to be spent among the care receivers. Consequently, time spent in the office is limited. Nonetheless, the office is used a lot during morning meetings, coffee breaks and lunches, when people meet up for informal discussions. Administrative tasks are also taken care of during these breaks. I used this office time to ask questions about particular documents or actions, and search for clues about their role in an activity recorded in a particular binder or file. My experience follows what Sellen and Harper (2001) noted as a familiar experience,

‘...we have found in all our studies of documents that people almost always have a story to tell about the document they own. They might tell us why a
certain document is important or how it reflects a bit of the company’s history...’ (p. 179).

It is similar here, although there is a slight difference in that most of the documents refer to visits and how these visits have unfolded. When the care assistants were asked about the documents they worked with, their answers revealed information about how responsibilities were distributed within the team and the kind of information that they saw as crucial and important for their work.

Data about tools and repositories used regularly by the care assistants and the tools themselves represent a large section of this data stack. The role and content of these repositories are both informal and formal in character. As an observer with a first-hand account of the situation, the activity which surrounds a tool is of the utmost interest. Each and every one of these repositories holds a particular structure and order, and is related to practical activities. Here, the repositories of importance are found in paper-based diaries and ledgers, binders of different kinds and documents. As the study progressed, most of these resources were transformed into a digitalised format.

The home of the elderly is a borderland between home care, home health-care care activities, and the family and relatives of the elderly person. In order to handle communication between all involved parties, different repositories are mobilised; these function as information hubs and are not yet digitally transformed. Examples of such repositories could be a medicine cupboard where medicine is kept and recorded or a paper note giving the proper instructions for an elderly person’s particular breakfast routine every morning. These are things which all hold information that is currently not recorded elsewhere. They are more or less small islands of information, which are totally disconnected from the home care office and the ongoing transformation of traditional repositories. While participating in the activities which take place, I am able to focus on the flow of information carried back to the office by the care assistants. This information was, for example, added to shared diaries using paper notes or brought up as a relevant discussion topic during meetings.
<table>
<thead>
<tr>
<th>Research device</th>
<th>Research sites, objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participant Observation</strong></td>
<td></td>
</tr>
<tr>
<td>Field strategies</td>
<td></td>
</tr>
<tr>
<td>Follow people, technology, information and plots</td>
<td>Through involvement in home care work activities, informal discussions and conversation give a better understanding of the practice and use of technology in the various settings and how technology support is used and involved. Through observation and the identification of patterns of use, the goal is to learn motives of use and identify interactional affordances of various tools and devices.</td>
</tr>
<tr>
<td>Individual</td>
<td>Attain motives and background of particular events</td>
</tr>
<tr>
<td>Group</td>
<td>Attain group perspectives and background of particular events</td>
</tr>
<tr>
<td>Interview strategies</td>
<td></td>
</tr>
<tr>
<td>Question based participation, QBP</td>
<td>Attain opinions on problems and opportunities with technology as well as discrepancies in group perspectives, and, method-wise, align Alpha and Gamma Was not involved</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Concerns a questionnaire distributed by the software application provider in the early stage of the research process</td>
</tr>
<tr>
<td>Photos</td>
<td>Document observations and get access to an historical account of the context</td>
</tr>
<tr>
<td>Reports, internal documents and telephone bills</td>
<td>Learn policies and get hold of formal structure of the organisation</td>
</tr>
<tr>
<td>Other data sources</td>
<td></td>
</tr>
<tr>
<td><strong>Software providers</strong></td>
<td></td>
</tr>
<tr>
<td>Alpha 2001-2006</td>
<td></td>
</tr>
<tr>
<td>Beta 2002-2006</td>
<td></td>
</tr>
<tr>
<td>Gamma 2006</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3.6.** The configuration of research techniques and their potential role and anticipated outcome.
A video camera can sometimes offer useful support when carrying out participant observation. The set-up of the video recordings in this study can be seen to be associated more closely with traditional control room studies (see Hindmarsh et al., 1999) than many of the other techniques used. I recorded the majority of the morning meetings observed on videotape. The meetings were also recorded on MiniDisc, just in case the video camera failed to work. This combination of video recorder and MiniDisc had a couple of advantages compared to traditional observation aided with pen and paper. Firstly, I could focus on the activity without worrying about missing anything essential. Secondly, together they offer some assurance that the activity is, in part, captured on camera. This left me free to focus on particular aspects of the activity which unfolded. I have marked such events in my notebook along with a time stamp, and a brief comment on the orientation and category of the event. These provided an input for questions and were natural icebreakers and topics of conversation. I chose not to engage and become an active participant in the meetings mostly because I wanted to view the interaction from some distance. Secondly, together they offer some assurance that the activity is, in part, captured on camera. This left me free to focus on particular aspects of the activity which unfolded. I have marked such events in my notebook along

Besides the useful mnemonic features, the camera set-up provided data which revealed repetitive behaviour; sections, phases and transitions in meetings were more clear than other data sources would have revealed. The analysis of the morning meetings was enhanced and it was due to the video recordings that the structure of the meeting and its crucial connection to contextual features such as the seating arrangements and the location of the computers became important observations.

Workshops - Question-Based Participation (QBP)

A particular strategy already discussed above was to follow the information; thus, to follow a thing. Information passes in and through different tools. It is, therefore, important to observe and understand the activity which involves the use of these particular tools. I also felt that it was important to identify the extent to which the observations were transferable from one place to another and from one person to the whole group. I employed participatory workshops with the majority of the home care teams in the study to scrutinise the activities or the essence of the activities.
Figure 3.5. The QBP approach generates a multitude of answers to the different questions, which in the next step is discussed and categorised by the participants and the moderator during the session. This are answers given in Alpha 2006, which also gives a summative account of the effects the care assistants experienced in their work. The English translation of the answers is found in Figure A.4 in the appendix.
The Question-based Participation (QBP) approach was employed in Gamma. This is an adaptable technique, which serves a range of different possible purposes. The idea is simple. I write a question on a large piece of paper displayed on a wall or some kind of board. The participants give their answers on smaller pieces of paper, which I collect. After all the answers are collected, one of the participants reads out loud the answer before putting it below the question. In this situation, I control the session through questions but, through the process, the participants incrementally get to the position where they have ownership of the questions that are discussed. This is because we are using their words and their experienced problems connected to the questions.

Through simple logic, the technique gives access to complex answers and discussions that have perhaps not surfaced before. It is important that this technique is not used selfishly and that it is anonymous. What can be seen, for each and every question asked, is the diversity of opinions found among team members. This is interesting, since some truths that are told might be truths that are strongly connected to the position and influence of a particular person. QBP is a technique through which hidden truths might surface, giving an unexpected result or even confirming something which emerged earlier. QBP is a change tool which gives the whole team an awareness of its opinions and circumstances. It is, thus, a tool and technique, which will influence the team even after the observer has left.

**Design, distribution and use of questionnaire**

Questionnaires were involved in two instances of the study. Representatives from the software and system provider in Alpha and Beta had put together a questionnaire that was presented during a user meeting on the first day in the field. Although there were no more than 20 answers, the questionnaire gave me crucial information to support my focus and attention. A second, more elaborate questionnaire was also developed. It was introduced in response to a request from Gamma’s IT process manager. In my work producing the second questionnaire, I found great support given by the activity checklist (Kaptelinin and Nardi, 1997; 2002). The checklist covers a fundamental activity-oriented chart for the propositions and answers searched for among the people in the organisation. The work resulted in a questionnaire which comprised 20 thematic areas, each containing between six and 12 propositions. These were answered on a four-point Lickert Scale, from ‘I totally agree’ to ‘I totally disagree’. The area managers distributed the paper questionnaires to the teams in the organisation. They also collected and sent them to a coordinator. The paper-based questionnaire was prepared for digital scanning, a procedure managed by an external agent. I was only involved in the construction of the questionnaire and I received the complete ques-
tionnaire material as an Excel file via e-mail. I did not base the entire evaluation on the questionnaire survey alone; rather, it was used as one source of data to contrast observations and interviews. The important task was to confirm and challenge observed patterns and the questionnaires served this purpose well. The result showed that important key observations ran across and through the material. There is however much more information condensed in the result given by the questionnaire.

**Influencing the observed practice**

The distinct quality of participant observation as an omnibus field strategy is its promising potential to get close to the people and culture, which is the focus of this research programme (Patton, 2003, pp. 262-264). Participant observation necessitates a research process which is permeated by socialisation. A relevant description of how that process of socialisation can be understood in situated learning can be found in research by Lave and Wenger (1991). I have come across aspects of the setting that would not have come up in an interview situation. Topics and situations which people are unwilling to talk about or even see as irrelevant could be identified through observation of discussions and practical work. Consequently, if an interview session followed an observation, I could produce data that provided both the depth that is usually associated with interviews and a ‘rich picture’ offered through my observations.

In the midst of the fieldwork, I found myself in a position where I moved from being a novice of what a home care means to slowly becoming a sort of member or a friend of the community being researched. I learned that the researcher does have a legitimate position vis-à-vis the members of the studied community. A legitimate position is achieved if the researcher shows respect and integrity. I also learned, however, that it do not go beyond the researcher role. I am not a fully fledged home care worker and I have a different relation to the technology that is being used and studied; this is perhaps most visible when I talk and ask questions. When I talked about technology with the care assistants, I used a different language to that used by the home care assistants themselves. Sometimes, the questions generated further questions and reflection rather than straightforward answers.

As a participant observer, I had an influence on the work context and, for a short time, became part of the assimilation process. During fieldwork, I raised questions and engaged in discussions that added a dimension to the care assistants’ situation. I found this to be the case on many occasions. In particular, in many of the discussions I had with care assistants in between

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2 The evaluation is presented in Orre (2006) *Utvärdering av Effektiv planering och Mobilitet i Hemtjänsten.* Workingpaper, WP 06.01.
different house calls, certain aspects of their own use were often shown to have already been thought of or considered in a similar way. On other occasions, ideas were generated on how the technological support could be configured to help deal with particular problems that the group, not me, was currently experiencing. Having this role also meant being an agent of change or facilitator in the organisation.

**Making sense of the empirical material**

Fieldwork revealed at an early stage that meetings were the central nodes in the social life of home care. Through it, one can identify categories that clearly support the analysis of collaborative work activities and interaction in the home care workplace. The boundaries of the supporting structure’s elements need to be broken down and re-connected, interlinked, discarded and finally merged to be presented as a holistic whole. It is difficult to attain a comprehensive whole when a vast source of data is stored in many different resources. However, I learned that the fragmentation itself provides a structure that effectively supports the ‘mind work’. The field work process is ambiguous (Jackson and Ives, 1996) and a way dealing with the fieldwork material is selectively narrowing the focus within the previously explored broad field (Wolcott, 2001).

Ethnographically informed work is a cyclical process, which provides the researcher with the means to examine the work culture from the inside out. In this research approach, there is naturally a tension between explicit and implicit culture, between saying and doing, between a native’s voice and that of the researcher, and between representations of the local cultural world and the larger cultural worlds that surround it (Schwartzman, 1993; Jackson and Ives, 1996). An examination of how people involve mobile ICT in their activities is a learning process, much like the abductive process ( Alvesson and Sköldberg, 1994, p. 45; Patton, 2003). This process holds a dialectical relationship between data and established ideas. It is an unavoidable resource in this approach; indeed, it is perhaps the most powerful.

“...The analysis of the empirical material can very well be combined with, or preceded by, studied of earlier theory in literature: not as a mechanical application on singular cases but as a source of inspiration to find patterns that provides understanding...” (Alveson and Sköldberg, 1994, p. 45. In Wiberg, 2004, p. 108, (Wiberg’s translation)).

The composite fieldwork descriptions, which are generated in sketches, texts, transcripts, pictures, news cuttings, photographs, recordings and so on (see figure 3.3), make up the ethnographic record (Crabtree, 2003). At first glance, the data appears to offer confusion, chaos and disorder. Crabtree suggests that some order is brought to bear through extracting intelligible
tales of the cooperative work and its organisation (Crabtree, 2003, p. 55), and having a large repository of data and a strong need to attain some sort of orderliness and structure.

<table>
<thead>
<tr>
<th></th>
<th>Participant observation (h)</th>
<th>Morning meetings (on tape)</th>
<th>Interviews</th>
<th>Questionnaire</th>
<th>QBP, (h)</th>
<th>Other data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>300</td>
<td>29 (28) (34 hours)</td>
<td>20 (300)</td>
<td>15</td>
<td>4</td>
<td>Photographs, diaries, documents, internal reports, audio recordings</td>
</tr>
<tr>
<td>Beta</td>
<td>50</td>
<td>4 (2) (3 hours)</td>
<td>5 (200)</td>
<td>10</td>
<td></td>
<td>Photographs, documents, reports, audio recordings</td>
</tr>
<tr>
<td>Gamma</td>
<td>120</td>
<td>8 (0)</td>
<td>15 (30)</td>
<td>230</td>
<td>12</td>
<td>Photographs, documents and internal reports, evaluation document, audio recordings</td>
</tr>
</tbody>
</table>

Figure 3.7. The body of field data which has been generated through the field work.

The analysis of the data is managed in four separate steps or methods, if you like. In these four steps I have focused on *re-occurring interaction patterns and breakdowns and situations involving mobile ICT and other technologies*. In the fieldwork, my questions to the care assistants were aimed at grasping and discussing *the functional role of the technologies in the work activity*, which supported the analysis and the necessary associations between roles and interaction patterns. Working with data, the recognition and identification of patterns and themes in seemingly random information is a crucial task (Patton, 2003).
In this fieldwork, the questions offered by Rogers and Belottoti (1997) and the guidance given by the Activity checklist (Kaptelinin et al 1999) emerging patterns in behaviours was identified; those found in use situations, diary text or other transcripts together make up the presented view. The identified patterns explain a particular event as a red thread which can be identified in communication and interaction activities, and found in the repositories and tools used by the care assistants. In this study, patterns of interaction emerged in written information, and in observed behaviours and use situations. These patterns are a result of the dialectical process between the native’s voice and the researcher’s voice. The analysis is presented in chapters four to seven. Each chapter deals with a particular aspect of the observed practice, and deals with a particular dimension of the work practice.

The identified patterns materialised in the construction of a series of vignettes and contextual images, based on transcripts from interviews and field notes. Van Manen (1988) provides examples of how such material can be presented and how the different genres communicate the field material. These provide the reader with a focus as well as a whole situation which was connected to a particular event. The role of the vignettes was to provide a realistic account of the activities and support the analysis of the threads of activities through tools and situations seen through the eyes of the care assistants. The role of the contextual images was to provide a conceptual and analytical account of the key observation the different situations hold. The objective met by these vignettes and contextual images were that they had the power to effectively communicate both the case and the crucial aspects that directed the gaze of the analysis. These account provided through the different scenarios documented in the fieldwork also supported the narrowing down of the discussion and further work to identify patterns in the data.

The contextual images have a clear influence of use case models (Villier and Sommerville, 2000), dealing with ethnographical data (Sommerville et al, 1993), rich pictures (Checkland, 1993; Monk. 1998) and patterns of cooperative interaction (Martin et al, 2002). They play an important role in the ongoing research process; thus, new and old experience are moulded together. It is my belief that this is inevitable in a study which takes place over a number of years and which also includes different research sites. The material invites you to make a particular interpretation, which later has to be abandoned when a new set of data is obtained. But, that particular step could not have been taken without first having made the initial interpretation. Methodologically, I have worked as carefully as the situation has allowed, housekeeping the data and resources with one sole aim, to establish trustworthiness and authenticity in the material. This applies not just to the results, but also to the approaches and practical steps used in this research and from which these results are derived.
Chapter 4.

Home Care Geography

During the past 60 years, elderly care\textsuperscript{3} in Sweden and Scandinavia has undergone a process of modernisation\textsuperscript{4}. People today are tending to live longer than was the case some 20 years ago. A general development is that a large group of people will soon be in need of home care services and that elderly people will continue to stay in their home environment longer than before. Staying longer at home also means that qualified care and support has to be offered in the home environment. This creates a challenging situation for home care organisations and current approaches to the organisation of home care. Studies in social work do not hold a calibrated lens towards issues relating to the introduction and use of new technologies (cf. Szebehely, 1995; 1999; 2005; Wikström, 2005; Olsson and Ingvad, 2006; Sörensdotter, 2008). These studies rather embrace the development of the care service itself, its organisation, roles, values and norms. Together with studies that embrace ICT in home care and the different facets of the current computerisation of elderly care which give evidence of the multifaceted nature of the home care profession (Hedström, 2004; Jansson, 2005; Jansson, 2007; Melander-Wikman, 2008; Nilsson, 2008).

\textsuperscript{3}Johansson (2003) offers a comprehensive summary of the social service and elderly care organisation

\textsuperscript{4}A comprehensive background discussed and presented in Szebehely (1995; 1996; 2003). A more recent and general account is found in Nordic Council of Ministers report and overview of contemporary social work research in the Nordic countries (2005)
Home care is described as being a cooperative, communicative and knowledge-intensive practice (Hedström et al, 2003). However, it maintains more of an oral culture than a written culture; knowledge is communicated, although not necessarily written down as a first priority. Despite this, home care is a document-intensive practice and documents play an important role in knowledge transfer activities (Hedström et al, 2003; Pinelle, 2001). The care assistants who I have shadowed, work in a context where it is not only their clients who matter. Cars, roads, rugs and carpets, stairs, backpacks, technologies and a multitude of other things matter just as much. They impose restrictions as well as bring opportunities when carrying out work activities with clients. The clients’ health and home conditions are not easily predicted. Conditions change on a regular basis, offering new problems and situations, which have to be solved by the care assistants. In home care practice, flexibility is a virtue (Jansson, 2007).

It is in such a context that care assistants are currently learning how to use new technologies. In this chapter, my aim is to present those dimensions that were observed to be significant in the home care geography. It is a landscape filled with all sorts of factors that affect the way that people learn to use new technologies. Orr (1996) shows the role geography and the landscape have in social practice (Yanow, 2006; 2005). It is in this work a step towards creating ‘a map’ that, from a practice-oriented view, combines physical aspects in the workplace with the virtual and practical dimensions found in routines, use of technologies, rules, policies, rationales and values of work. It means attending to the settings, the places and the spaces, in which home care practices take place (cf. Yanow, 2006; and Rafaeli and Pratt, 2005).

**Home care work and technology**

As a computerised information system, ICT is not a tool that is used in one particular context, namely the homes of clients. It is rather found in administrative tasks or used by administrators (Andersson and Ortman, 1995). When my study was initiated, home care work had not reached the level of computerisation found in many other professions in the Swedish public sector. At the beginning of this study, ICT was mostly used for workflow and documenting activities. However, a vast number of different development projects and pilot studies were about to change the face of home care, introducing ICT on a broad scale. It is not fair to say that home care, as a practice, does not involve the use of technology. Home care practice has always involved the use of technology (Hedström et al, 2003). Common to the trade are technologies found in traditional medical appliances, domestic appliances and ergonomic appliances, which support specific tasks. For example, they might include heavy lifts or smaller solutions to support the putting on of compression stockings with reduced risks for hand and back injuries. The
everyday use of phones, fax machines and beepers have, for a long time, been tools that are not only commonplace but are important communication tools that sustain practice. Similarly, the last decade has seen the mobile phone become a fundamental component of home care. Studies of home care practice (cf. Szhebeley, 1996) do not tune into the everyday use of ICT and most accounts do not consider the practical role of ICT. One thing seems clear: the experience of ICT as a support for practice is poor and the practical role of ICT in this context is poorly documented (Andersson and Ortman, 1995; Hedström, 2003, Koch, 2005; Jansson, 2007).

Studies that discuss problems connected to the effect of ICT use are found in Christensen (2001) and Vabø (2003). Here, ICT is mostly a tool for administrators. There is a general view of ICT that is strongly associated with a legacy of industrialisation. Eliasson-Lappalainen (2003) sees ICT and the methods surrounding its use as threatening the ‘human face’ of care work, transforming elderly care into a ‘care factory’. It is certainly the case that home care is currently being industrialised - albeit slowly - and that ICT is a crucial instrument within that modernisation process. Christensen (2001) discusses an observed consequence of this technology in her work. She considers that the use of ICT seems to direct the care assistant’s attention towards the obvious and observable. It marginalises other aspects, such as experience and tacit dimensions of practice, which earlier were significant aspects of home care practice (Szebehely, 2005). Christensen (1999) highlights the dangers of blindly following technological rationale, using instrumental models of work. Hence, system procurement depends on a rationale for its deployment in order to define the long-term goal to be achieved. This rationale is inscribed on the design of the system, and generally prescribes the work to be carried out.

Computerisation in elderly care is explored in work by Hedström (2004; 2006). Hedström examines different groups of actors and their expectations of the role that ICT will play in future elderly care. Her analysis of the computerisation process reveals four categories of value drivers. The first of these categories comprises the management values that address the effects of ICT within the administration and management of elderly care. In most cases, these include increased efficiency, reduced costs, and more effective quality assurance and information security. The second category comprises integration values. These address ICT from within a cooperation context, establishing mutual perspectives and an understanding between professional groups involved in the care process. The third category addresses care values. Here, ICT can be found in the context of the delivery of correct, safe and continuous care, supporting contact between the elderly and the care professionals. The final category emphasises professional values, addressing the ways that ICT can be used to strengthen professional work in elderly care. Hence,
modernising elderly care and supporting an increase in the status of care work provides a new means for knowledge development. Hedström’s work provides a careful account and understanding of the complexity of ICT and elderly care. Administrators’ objectives and the anticipated implementation and use of ICT studied here can be easily linked with the categories identified by Hedström (2004).

Together, the above objectives challenge home care organisations to actively adopt new perspectives on care services in line with the changes which are taking place within the care environment and current debate. Nevertheless, ICT systems in elderly care are still seen mainly as a support for management values (Hedström, 2004, p. 254). When middle managers and specific IT departments procure ICT systems that are intended to support work practice, the prerequisites and conditions of practice are not always understood; sometimes, they are forgotten in the process (Jansson, 2007). Crucial information sources when designing an ICT system for home care are the care assistants themselves. They know their practice and the problems they face. Jansson (2007) shows that care assistants have difficulty in articulating their demands on new technologies, mainly because they find it hard to express the subtle nuances of their role in the care work practice. At the same time, as the following chapters will show, care assistants repeatedly show that they are often in situations where they collectively invent tools that support their practice effectively. What Jansson (2008; 2007; 2006) does is to demonstrate a possible way of turning attention towards the practice of home care assistants. Her clear intention is to find a situation where developers can learn to trust actual experience and practice knowledge rather than their own solutions to practical problems. It is a approach that implies an integrated design in which work organisation and processes take into consideration the way that technology can support work activities.

This approach requires the active involvement of care assistants throughout the design process. In this way, they are placed in a better position, not only by taking ownership of their questions and contribution in the design process and any design problems that have to be addressed from their perspective, but also by becoming more aware of their own skills and competence relating to ICT use. The former dimension is also explored in Häggström’s work (2009), where action-oriented development techniques for systems development are scrutinised in the context of social care. Her work provides examples of care models aimed to bridge the gap between work analyses, including the involvement of care receivers, relatives, actors within social care and developers. The system referred to is aimed at providing mobile access of information at the point of care. However, the latter point that Jansson puts forward is strongly connected to empowerment, which also implies moving towards a new work situation with increased responsibility.
Jansson’s work complements the picture of home care given in this thesis on several accounts. Her knowledge of home care practice after thirteen years working as a care assistant is indisputable. Furthermore, her focus on the use and effects of novel mobile ICT and ICT shares similarities with the empirical studies that underpin this thesis (Jansson, 2006; Orre, 2006).

Re-establishing lost qualities through new technologies

A core component in most of the recent political initiatives is the use of ICT. It is a symbolic resource on a multitude of accounts. In the context of home care it is seen to offer the means to attract younger and qualified personnel to an occupation that unfortunately has a legacy of being underpaid and lacking clear-cut career opportunities. ICT would communicate both inside and outside the organisation that professional development is taking place within home care work in general; this is a message that would also attract male applicants who are currently under represented (Jansson, 2007).

Another, more practice-related aim is to provide tools that will ensure that resources in elderly care are used as efficiently as possible, and move towards a uniform method that will secure quality and efficiency of work, and support the effective documentation and planning of work. ICT provide a tool for assessment in terms of the quality rating of services and measurement of time. Mobile ICT would act as a technological support tool for administrative activities, alongside care activities. This would thus lower the risk for conflict that is always present between the main care and administrative activities. ICT support organisational development to integrate and harmonise routines and work between departments and stakeholders in the care process. It is anticipated that ICT will give municipal elderly care the means to cope with changing conditions and secure quality of care. Indeed, with funding levels unlikely to increase, municipal home care organisations will be forced to consolidate and optimise their delivery of services.

Whilst working on this thesis, I have had the opportunity to be acquainted with systems which are in line with the above intentions. JoLiv mobile care™, TES and PocketVO are all designed to support a home care organisation as a whole5. Thus, the systems are intended to give the organisation a mechanism for inspection to attain a “full picture” of what the workgroups and individual care assistants do, including identifying the resources used, and where and when they are used. It is thus possible to assess the quality of

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5 It is important to note that this research concerns only those systems which were available at the time of the study. An ICT system is continuously evolving, adding functionality, redesigning features and so on.
work from a number of formerly unattainable variables, and to employ powerful tools that will assist in planning and budget work. The general rationale for the use of these systems, i.e. the user behaviour it promotes, follows three propositions. Firstly, they provide support for documenting the work whilst it is being performed. Through mobile ICT, users have an opportunity to measure against their objectives anytime and anywhere, following any rational concerns arising from work activities in the homes of the elderly. Secondly, these systems support the fieldwork. Information about the clients can be brought to the point of care. Thirdly, they support scheduling and planning work. The general political objectives that these technologies meet are to:

In Szebehely’s (1995) studies of the work organisation of home care, three models of work and organising principles were seen to co-exist during the mid 1990s. In the traditional work model, care assistants had a few elderly people to visit every day in the local district. This work model did not require any shared locale or office. The care assistants worked on their own and went directly from home to tend to the clients. Through modernisation, home care has been transformed from this traditional work model into two organised work models.

- **The assembly line approach**, which referred to care assistants as working in-house in care home facilities.

- **The small self-organised group model**, in which work is organised in small workgroups of care assistants working in local districts. It differs from the traditional model in that it is more organised. The work model involves more coordination of tasks and activities. This model also comprises components that traditional models do not have, such as documentation.

A decade later, the small self-organised group and the assembly line approach are still used in most home care organisations. During this study, I have found that these two models still co-exist, although the boundaries between the two are not altogether clear. The latter two are more common, whilst the small self-organised group is of more relevance to this work than the other two. What is interesting is that two work models, the traditional and the small self-organised group, are ‘geographically’ similar. What is even more interesting is that, when comparing the two models, Szehebely (1995) found that time appeared to be used differently. The small self-organised group offered less time for direct care activities and more time for support activities (see figure 4.1) than the traditional model. With the traditional model, I have found that each care assistant only had a few care receivers to attend to every day, which meant that almost the whole workday was dedicated to direct care.
Figure 4.1. The distribution of time between care activities, support activities and breaks in the different work models in home care (Szebehely, 1995)

According to the traditional work model, home care work was generally solitary, fostering autonomous behaviour. This autonomy still applies to home care work in general today. However, home care in a small self-organised group does involve a higher degree of support activities, such as planning and scheduling and articulation work (cf. Suchman, 1996; Schmidt and Simone, 1996). A small self-organised group is bound to make efficient use of resources, since people and time are managed as a shared accomplishment. Even if, to a certain degree, one could say that the small self-organised group is an assembly line-oriented adaptation of the traditional model, it is a work model which presumes that people engage collaboratively and cooperatively. The small self-organised group model is a clear result of the professionalisation and modernisation process that home care has seen during the last 30 years. Instead of having a few clients, a care assistant might during one day have between four and 11 different house calls on a round. In this situation, the management of time becomes a complex issue. Time is not only used to care for clients in their private homes. In order to get there, a large portion of work involves supportive activities, such as managing transport, walking time, planning, meetings, remote coordination and so on. The small group district model thus involves a weaker relationship between carer and care receiver than that found in the traditional model. The traditional model offered a personalised service and the care assistants could establish a much stronger relationship with the elderly people. The development of the work in the small group district has, however, weakened these bonds.

According to the underpinning objectives, the proficient use of ICT can play a critical role in this change process, aiming to provide the efficient and careful delivery of service in new work models. As a consequence of political objectives that are currently imposed on home care organisations, they face a situation which, in fact, will mean the reintroduction of the traditional care
model, albeit somewhat modified. Such a shift will be brought about by a change in care work objectives to those which support a high level of continuity. In this case, elderly people will come into contact with fewer care assistants. This reflects a contemporary trend within elderly care and, in part, restores elements from the traditional home care model. Another objective is that the care time, including field activities, has to increase. It is hoped that mobile ICT will minimise administration work and time taken for meetings in order to free up more care time. A modest goal for a home care organisation would be to reach a level of 65% care time in small group districts. Some system providers argue, for marketing purposes, that up to 75% could be within reach. The question needs to be asked as to whether this goal could be achieved and at what cost. Time is central to the home care geography sharing similarities with situation at hospital wards (Reddy and Dourish, 2002; Zerubavel, 1979) which Nilsson and Hertzum (2005) and Nilson (2008) provides true accounts for. How the use of time is perceived, between ‘practice’ and ‘administrators’ is however a matter of dispute, which the following chapters indirectly give evidence of. A traditional view of home care was that one care assistant or at that time domestic worker, had full responsibility for a small number of elderly people, which also implied a situation less dependent on effective coordination. This person both guaranteed continuity and ensured that the service met the personal needs of the elderly person. Examining the arguments which motivates the utilisation of ICT in home care, this is model which have values that though effective use of ICT seems expected to be restored.

Facets of work in a small group district

There is a longstanding tension between the two rationales that underpin care work activities. The first is termed the care rationale (cf. Szhebely, 1995; Wearness, 1984). It denotes the relationship between the carer and the elderly person, which in turn is either regulated by, or controls the second rationale, the wage-earner rationale. This relates to how time is used, and the actions and activities that are promoted within a workgroup. Tension between these two rationales is always present, and the priorities are mostly in favour of the person receiving care rather than the care assistant providing the care. My own observations have confirmed that tension is indeed present. But it does not have any bearing on peoples’ use of ICT and offers no reasonable explanation for such use.

There is, however, another underlying principle and tension present in home care. It emerges out of current developments. I discuss the tension as one that is found between direct and indirect objectives of home care practice. Indirect objectives concern preparatory activities, such as articulating the division of labour, administrative tasks and activities that occur in the
home care office environment. These comprise administrative tasks, which keep track of every action and record these for future evaluation and aid decisions. This work is usually carried out in a locale that multifunctions as an office, dining room and a meeting room. Almost all the social activities held for the whole work group during working hours take place here. Files are created and, depending upon the sensitivity of the information within these files, they are filed in locked archives or kept in binders on bookshelves. A vast amount of information is posted on the closet cupboard doors and on different bulletin boards. The direct objective in home care work is to tend to the elderly; these activities do not have a fixed location for their implementation. The continuous change of contexts and situations while on the move means that there are essential differences between these and ‘office’-based work activities. In the home care context, the direct objective is seen to relate to the physical activity which takes place in the homes of the elderly. An activity forces the personnel to adjust and acclimatise to new physical conditions for each and every visit. Every location has its specific features. For each and every house call, the personnel have to adjust to someone else’s organisation of things, such as the use of household commodities, including plates and cups, towels, furniture, vacuum cleaners and so on. They have to be treated according to and within the restrictions that each and every elderly person imposes on their own environment. The health condition of the elderly person imposes yet another factor, which heavily influences actions and the completion of task. The physical or psychological condition of the elderly person has a strong influence on the strategies that each home care assistant plans and adapts before and during a visit. How these work strategies materialise are often the result of the information given during a morning discussion and in coordination activities.

Direct and indirect objectives also focus attention on specific locales, namely the meeting locale, as well as on the fieldwork and the homes of the elderly. It is noteworthy that these locales provide crucial activity contexts where technologies are likely to be used. They also divide the tasks into primary tasks, directed by the primary objectives, and secondary tasks, which are directed by indirect objectives, as described above. But how do these objectives and tasks affect the strategies that are formulated in practice? A part of the material given below has previously been published in Orre and Watts (2006), and I will use this material as an initial exploration of the home care geography. The exploration answers to the second question of the thesis and provides a focus for how care assistants made each other aware of their work. While doing the exploration, a concept of awareness was deployed to unpack the complexity of practice and use of technologies serving that purpose which was drawn from those ideas on the role technologies in cooperative practices (Moran and Anderson; 1990), and the views on technology features
as learning devices (Heath et al., 2001; Mark, 2002) combined with ideas on the transformational role use of novel technologies have (Agre, 2001). We proposed the idea of an awareness strategy which we defined as a practical sense of knowing that was put forward as:

"...information that is acted on by collaborators as knowledge, which is generated, given or accessed through interaction which constitutes and contributes to the cooperative accomplishment of an orderly workplace (Orre and Watts, 2006, p. 251).

It is a proposition of awareness that strike a chord with the awareness of knowing as it is discussed by Strati (2003) where practice and organisational learning are approached from an aesthetic perspective. The use of the term knowing aims to capture practical knowledge and relates to the discussions and distinction between explicit and tacit knowledge considered by Polanyi (1962). In the process where the care assistants are making each other aware, tools and technologies were identified, which by the care assistants were used to connect different locales and activities. Making each other aware is central to home care; indeed, it functions almost as a mechanism in home care practice. Below are three vignettes that describe and present the cooperative practices that occur: (i) in a coordination meeting; (ii) on a home care visit, observed to provide both constraints and factors that stimulate the use of technology in day-to-day activities; and (iii) in a situation where the care assistants re-coordinate their activities in the field.

**The meeting locale - an activity central**

The first vignette reflects the work activities that take place in the locale or home care office, the most important place for home care assistants to carry out their work. It describes the use of tools that connect the different places in which care assistants carry out primary, secondary and preparatory tasks. Several studies, including those by Wiberg (1999), Orr (1996) and Brown et al. (2001), have addressed the importance of places and locations in which mobile workers can meet and socialise. They were given recurrent opportunities to discuss problems and situations that form relationships between people in a group. Home care work is no different. The office or the meeting locale is a central for many activities. Complementary work focusing on the aspects that constitutes a work context such as the meeting locale is found in Kirsh (2001) and in Sellen and Harper (1999). In this study, care assistants have shown an articulated need to meet and exchange the experience of the past day’s work and the work for the coming days. In this activity, a large table around which all the care assistants sit plays an important role. It is a table that, in most cases, serves many different purposes. During the morning meeting, besides the coffee mugs and on occasions sandwiches, care as-
sistants use the table as a focal point to plan their activities for the day, and to get enough information from colleagues about the elderly people they themselves are to visit. It is a multipurpose table; most of the space is covered by resources such as binders and diaries, and the desktop computer.

The large group diary is a particularly important artefact, containing specific case information that carries over from previous home visits. The discussions and the use of technology are interwoven in a complex web of tools and gestures that often hold parallel threads of topics and concerns. The numbers used in the vignette below are codes used in this practice to maintain clients’ anonymity if they need discuss aspects of work and house calls in public spaces in the village.

“...The morning meetings are one of those highlights that Anne looks forward to every morning. When someone asks her what are the main reasons for her staying and working in the home care business, even though she often complains about the salary and the irregular working hours, her answer is always the satisfaction of contact with the elderly and in the team work with her colleagues. The morning meeting is one of the few opportunities that the whole group meets before they carry out their daily activities. As she came into the room, she shared a joke with Agneta about their night out the previous week. Yesterday, she promised elderly 516 to book an appointment with the hairdresser, which she did. The time was set for Friday 3pm and she sticks the hairdresser’s business card with all the necessary information into the diary at the table in the meeting room. -Now, I will not forget to take her there, I have booked the time for 516’s hair on Friday... Carrie - you will work on Friday won’t you? Carrie who was sitting right beside her replied, – yes I will, was it about 516?...She mentioned something about it earlier this week...no problem..

The meeting usually takes an hour and during this time they all have time to catch up with most of the important events that unfolded the day before. They also divide the tasks that are to be carried out during the day. Eva and Margret, who worked the evening before had added the note that 576 would need a reevaluation of his service plan since his condition had got much worse over the last couple of days. – Perhaps it is time to get the process started to get him a room at Råboken (an old people’s homes in the village) - if he continues to be this weighty...(Carrie added to the concerns that Eve and Margret were expressing...) - We cannot continue to have 5 visits a day for one single person...

During the morning meeting there is also time to go through those records and files that relate to the elderly people who she is about to visit. Usually, it is not necessary to go through those files in detail, since almost all information that would be helpful is discussed during the morning, but one cannot be too sure. Better safe than sorry, as always. Fortunately she found out that elderly 413 was staying with relatives for the whole week. She says that someone
must have failed to make a note about 413 and the fact that he will be away for the whole week, and she immediately corrects the information on the desktop computer.

Agneta was very concerned about 534 and the rapid change in her health condition. - She was not looking well at all yesterday afternoon. Her eyes were blurry and she had a fever. - We consulted DSK (the primary care unit), and they agreed that we give her the medicine she has been prescribed (Eve added more information about the case, and continued...). - We have to observe her condition closely today. By the way, who will take her today? – I can do that, Susan quickly answered, - I will have to go to 489 anyway, and it is on the same route. Susan asked if there was anything more that she should consider regarding the visit to 534... - If her condition is worse, just contact DSK, Agneta added... - next 587... - who will assist him today...” (The meeting is prolonged through the articulation of work and a simultaneous discussion about the care receivers continues).

The vignette given above is an example of the collective management of parallel information or social information exchange that characterises a shift change. Similar information is kept in a multitude of locations. There is a great deal of work involved in maintaining attention and consolidating information for any set of visits. The care assistants felt that most of the late appointments for the previous day were important enough to be recorded in writing in a range of resources during the morning meeting. Thus, each and every assistant contributes orally, by mentioning aspects worth considering to the whole meeting or to specific colleagues before the meeting is finished. This socially concerted aspect of awareness work involves a number of interesting components.

During the day shifts, the care assistants often choose to take on house calls where the elderly client’s situation suits the skills or interests of a particular care assistant. These interests do not result in ‘cherry picking’ or choosing work tasks that would mean an easier workload for the individual care assistant. The choice criteria can also include, for example, the fact that a particular care assistant may have had an argument with one of the elderly clients or that it has been a long time since an elderly person was cared for by a particular care assistant. Since responsibility for each elderly person is handed over every morning, each meeting also requires that the handover process is a person-to-person interaction. All the relevant information must then be added to the computerised history of the specific elderly client. These stories or fragments of information are identifiable in the tools that hold these currents of information in the work place. One such repository is the diary. The following vignette addresses its role and future development as I follow Anne’s preparatory work. She refers to both the desktop application and the group diary. The following vignette illustrates the use of the diary:
“...Anne was going through the diary. From a distance it was obvious that she was looking for something specific...What are you looking for?...Gun asked. - I am looking for some information about 577, she was taken to hospital last week...we should note when they return, should we not? – By the way, when are they going to make the changes regarding the message and note function in the application? The team had an ongoing debate whether to use the diary or switch to use the note function in the computer instead. Helena replied that, -the last thing I heard was that they where working on it, but they could not give any clear answers...

The problem is the following: the message and note function in the application is not designed as they would like it to be designed. When a note is added and connected to a certain task, they want the specific note to be added to the to do list as well. This was not the case and the result is that you have to cut and paste from one window to another each and every morning when that function is used. In the worst-case scenario those messages are forgotten. So they decided collectively to continue to maintain both their paper records and the record kept in the computer. Still, information is missed and not added to either of these repositories, even if it is nowadays a rare occurrence, one has to make sure that what is supposed to be in the repositories really is there.

...The meeting ends and the PDAs are synchronized at the end of the meeting and the relevant information is transferred while working on the rounds. But few have ever thought about notes and comments actually being available in the field. Whilst the handheld computers are handed out, the whistle blows for work to start and they all embark on those duties planned for the day ahead, leaving the base to enter their field of work...

The diary has long been the most important information resource in practice. It is here that care assistants find crucial information about the elderly, often because of encounters that colleagues have had with the elderly during house calls. It is also a tool which is browsed through several times a day, even if the person browsing does not add any information to it. It is an awareness aspect in the workplace and, as the vignette emphasises, it is a tool that is challenged by new technology. The design of the digital diary did not quite fit the custom and practice of the care assistants, something which they repeatedly remarked upon during observations and interviews. The diary is obviously central to their work. Its role is to communicate case specific information for specific care assistants. Yet, through the mechanism of its circulation, it also contributes: (i) knowledge of ongoing case history (medium-to-long term), (ii) situational case knowledge (yesterday and today, short-term history) and (iii) colleagues’ responsibilities and dispositions for the day. In short, its use fosters a generalised sense of awareness in the workplace, both of collaborators’ activities and the objectives of collaborative work.
Figure 4.2. The group diary contains need-to-know information for the time being. As the page above reveals, it holds information having the character of ‘need-to-know and in-case-of, which reveals a cooperative nature of the practice and the central role the group diary has. Page in the group diary. The upper section of the page records matters that need attention during the day shift. The lower sections give corresponding information for the evening shift.
Home care fieldwork in a small group district

Fieldwork is performed in the homes of the elderly. From an organisational viewpoint, the work in the office is a necessary but unproductive phase of preparation for fieldwork. When discussing the efficiency and quality of the services they offer, most municipal home care organisations are concerned with fieldwork. It is especially notable that the quality of care is typically associated with the number of hours spent in the homes of the elderly; the higher the number, the better the quality of care. There are actually incentives that, as a direct consequence, do away with office activities, since they are seen to be unproductive. The mobile workplace is a vast geographical area through which the care assistants move, by bicycle, foot and car, to make their way to the homes of the elderly, and travel back and forth (see figure 2) to the office locale. In all weathers, day and night, care assistants must get from A to B and know how best to do so, given the opportunities for travel at their disposal. In home care fieldwork, I can identify the sources of information recorded in the dairy, which are articulated through discussions.

Home care fieldwork usually involves six to ten house calls a day for each and every care assistant. A number of these house calls involve concerted collaboration in that they require attendance in pairs. The work is physically demanding and is governed by health and safety laws, union agreements and organisational directives. These demands require a moderate amount of coordinated collaboration on the part of the care work assistants; it is not simply a case of taking a list of given assignments and getting them done, one after the other. While carrying out care activities, the mobile technology does not have any particular role of importance; the focus is on the main objective. The system is used in situations which include signing off a task or checking who will be visited next. In the next vignette, I follow Anne as she goes on her first assignment of the morning. Perhaps more interesting, I see the links of information which give awareness in the workplace.

“...Her first task for the day was to tend to elder number 513 and see to that she took her medicine and was up on her feet. Her experience told her that this type of visit would normally take about 15 minutes. Including conversation! However, as usual, things didn't go quite as planned. The lady was in a tricky mood. She was not very keen on taking her pills, even though the doctor had prescribed them, and the task required that Anne watch with her own eyes that 513 really swallowed, without keeping the pills in her hand or spitting them out afterwards. But the little lady insisted on talking about the construction work by the library, using
the time to her advantage. Anne knew the lady was lonely, and for sure wanted more of Anne’s attention if possible. The visit had overrun by 10 minutes when Anne made a note in the medicine list posted on the cupboard door in 513’s kitchen before she left. When she got outside, she rang Maria to tell her about the delay, unfortunately without any success. She was supposed to meet Maria for the next visit; the second task for the day was to tend to 562.

Actually, number 562 meant not only to tend to the lady, but her husband as well. Anne looked forward to this meeting every day. The lady suffered from dementia and had difficulties with her mobility, and her husband has to carry out heavy lifting every day for her, even though, he is several years older than her. The task not only involved helping the lady with her morning toilet. She also needed help to get dressed afterwards. Once a week, the couple’s apartment was hoovered and dusted. On top of this, the husband had a strong urge to get all of his frustration out, at the same time blaming himself for not doing enough. This was one of the cleaning days. The regulations mean that Anne does not undertake cleaning tasks or heavy lifting by herself. There are usually two assistants on these tasks and Maria had already started to assist the lady in the bathroom when Anne arrived. The husband opened the door and they talked about what had happened since the last visit. Maria had for certain heard the story when she came, but the bottom line was that the night had been calm without any mishaps. Anne went to the kitchen to fetch a small broom and a dust cloth. While in the kitchen she went through the medicine list posted on the fridge…"

Before each house call the care assistants need to (i) attune themselves to the house call, meaning that each care assistant needs to prepare for the situation they might expect to find behind the care receiver’s front door. If earlier house calls have resulted in delays, it is not unusual for a care assistant to have to rush into a completely new environment. The information given through the diary and the day-to-day ongoing discussions is a support in these situations, since it often signals when unexpected situations may occur. Such advance information is also given in everyday stories of a specific house call, or through a note in the diary. Every activity’s specifics are part of a culture of discussion. They emphasise participation in activities, which otherwise would be isolated and solitary. Attuning to the circumstances is helped by the use of specific tools; here, the diary, computer and ongoing discussions play an important role. Through these resources, information can be shared in an asynchronous manner and combined with direct discussions about the current state of affairs.

While indoors, the care assistants need to (ii) adapt to the home of the care receiver. This means that they need to learn and be aware of routines and habits that are appreciated by a care receiver or to which they have become accustomed. When adapting to such situations, the care assistants un-
avoidably get involved in their care receivers’ lives. This involvement is also visible in the discussions the care assistants have when the orderliness of a care receiver is affected. The care receivers’ state of health might, of course, be such that it is difficult to discuss. Here, maintaining or establishing habitual patterns is a factor which helps both the care receiver and the care assistants. This method is often applied when the care receiver suffers from dementia. This is a common reason why home care is involved, if an elderly person is able to continue living in his or her home. It also helps the care assistants to operate as if they were providing individual care and service. Even if such a goal is not part of the picture, it is an obvious part of the work. Most of the care receivers are on medication. This is another element which connects home care and primary care. The care assistants are (iii) delegated to give medicine by injection, if necessary, or to carry out other care procedures delegated by the primary care unit. The intake of prescribed medicine is often closely watched. Among the care receivers, medication is seen as something suspicious. Some house calls only involve having to watch that prescribed medicine is taken properly. In the majority of the care receivers’ homes one will find an information hub where information about medication and any routines is kept. Usually this hub is kept somewhere in the kitchen area, since the medicine is stored either in a not-so-easy-to-access cupboard or the fridge, if it needs to be kept cold. The arrangement is also a support for relatives and family who share their time to help the care receiver. All intakes of medication are carefully recorded on a list. Routinely checking the information hubs ensures that the right amount of medication is given or taken and provides information about the health status of the care receiver. If their health takes a suspicious turn, this development is reported and shared amongst the team members.

When a house call is almost over, the care assistant records any necessary comments on the information hub. If anything is taken out of the home, such as laundry, it is mentioned to the client. It is also routine to explain to the client when they will return for their next visit. If possible, they let the client know who will be coming the following day. When the visit is over, the care assistants have to refocus and travel onto the next house call. If it is lunchtime or if that was the last call for the day, it is time to return to the meeting locale to document the day’s visits and to prepare for the following day’s work.

Field coordination

Although most visits usually take the time stipulated by the service plan, there are frequent exceptions. If a house call takes more time than estimated, it will affect a whole chain of events. Likewise, the health conditions of the care receiver may demand that the care assistant stays longer than planned.
This generates a great deal of work in terms of re-coordinating and rescheduling planned sequences of house calls, adding to the workload. However, it is worth the effort, since care receivers get the care and attention considered relevant by the work group. A crucial bottleneck which the care assistants need to handle are the different means of transportation. If any of the transport and supporting activities are delayed, it can have an effect on a chain of activities which will need to be re-articulated. The time needed to keep the operations going does vary with the seasons, but during the weeks and months when weather conditions limit transport options, more effort is consequently required. The geographical area over which the elderly people are distributed, demands, in most cases, the use of cars or other means of transportation, e.g., bicycles, on foot, or private car. Yet another factor that provides constraints in case work is the teams’ shared responsibility for the personal alarm that each and every care receiver has installed in his or her home. Emergency mobiles are, according to organisational policy, not allowed to be used for anything other than answering emergency calls and to make calls connected to such circumstances. Three cars are assigned to the home care work group, and at times when the workload is to heavy, private cars are used as well. We continue to follow Anne as her day unfolds. Here, Anne is on emergency call and is entitled to use one of the home care cars made available to the team:

"...The car door closed behind Ulla, who would tend to 456 in the next 30 minutes. - If everything goes well in the coming hours we should manage the assigned house calls before lunch, if no emergency calls are made, that is of course, Anne said out loud in order get Karin’s attention. The beeping and noise beside her was Karin looking at and maneuvering her handheld computer, checking the assignment list for the whole group. - We just have too much to do nowadays, how will we manage this having the numbers of staff we have, we should at least be allowed to call in more replacements. This was one of the disaffected discussions at the moment. Some of the staff had recently articulated that they had too much to do. They were even forced to use their private cars frequently as otherwise they would not have managed to get it all together. Anne usually took the initiative, at least with satisfying regularity, to be assigned for being responsible for the emergency phone to which all the emergency calls were directed. They arrived at 314 and it was time for Karin to get out. - Then we meet at 563, in one and a half hours, she said before she closed the door. What Karin referred to was the cleaning call by 563 which was a call squeezed into the plan this morning because of the impossibility of finding a time slot the very same afternoon when cleaning calls usually were planned. The RKF (refers to one of the cars the team have at their disposal) was said to be in need of service. It was Ulla who had noticed that the summer tires were still on. Actually it is a criminal offense to drive in winter conditions with such tires.
Anne picked up the emergency phone and dialed the number for one of the repair shops she knew in the village. - Hello John, do you by any chance have the time for our RKF this week... Perfect... on Friday you say... Friday it is then... yes, it's the tires, you have them stored have you not... perfect, see you then... bye. She hangs up. The car started to make speed again, her first duty this morning was to prepare a breakfast and coffee at 576, an older lady who had almost lost most of her hearing, but who had amazingly sharp eyes. Just before she was about to squeeze the doorbell knob the alarm phone rang its hard and sharp signal in her pocket. It was not an emergency call thank god this time she said while screening the phone. If it had been an emergency call, she would have had to call some of her colleagues and say that the missed house call needed to be attended to before 10. But It was Ulla who called saying that she was finished earlier than planned and wondered if she should sit and wait, or if she should call Birgitta and tell her that she was on her way by foot to assist her with 543 instead. - You do not need to pick me up as we agreed, I think Birgitta took her own car so we will have to use that until lunch, if she is not there I will just walk to 544, see you at lunch... and she hung up. The breakfast was served 576 at 8.45 sharp, fifteen minutes left until Karin was supposed to be picked up when the emergency phone rang again, same, same Anne said out loud - it must be the usual toilet visit by 435. 435 had figured that if she pushes the alarm button, rather than wait until the home care care assistants arrived, they will show up earlier. 435 was not the only elderly person that used the alarm this way, it was quite common. It usually ended with the assistants turning up earlier, and, as always, explaining to the old lady that the button is for your own safety when it really is for real, you know. Anne called Karin that she had to go to 435, and added that there was no reply when she tried to ring her, so she would better go and check it out. - I will be twenty minutes late at 563, you can start, I will show up in time..."

The fieldwork exposed in this vignette reveals the complexity that the care assistants have to overcome in pursuing collaborative work. It is noticeable that mobile phones are used to make colleagues aware of a late arrival or if another route is chosen instead. It is an awareness aspect, but this is not the same type of awareness that is connected to other repositories discussed earlier; it is rather a just-in-time delivery of awareness information, valid at a specific moment in time and directed towards an immediate response. Mobile phones do seem to be an important tool in the workplace. Decisions which concern the logistics of maintaining the orderliness of the workplace need to be handled just in time.
Figure 4.3. Home care fieldwork illustrating some of the constraining factors the care assistants have to consider in their work in the home care geography, in particular in articulation work and coordination activities. The influence of these factors varies locally. Each district is different, and here A1 who is driving the car becomes a resource for her peers.
It can be argued that communicating using private means is a feasible solution for any of those involved, and care assistants are compensated when no other solution can be found. The obvious need for smoothness in daily operations and the constant maintenance of the “normality of affairs” renders necessary an illicit use of the emergency phone, which instead should be a dedicated line. The care assistant with responsibility for the emergency phone suddenly gets to play the important role of mobile coordination central. This eases the logistics during days when transport is scarce. Moreover, it also allows a culture of remote coordination to develop through mobile phones. This is a development which is not sanctioned by management or policies. The culture of keeping each other aware of work progress and developments is given new means through mobile phones, which in this case are a technological infrastructure available in parallel with the mobile support they have at hand. It can be observed that the mobile support at hand is seldom used during fieldwork as this system does not align to the activities taking place there. Instead, other means offer a more adaptive architecture, as with the case of the mobile phone. These provide the means to establish a just-in-time connection to their peers.

Reoccurring routines and cycles

This work cycle in home care shows how people move to and from different activity domains. From now on, I will use base activities to denote those which take place in ‘the office’ and case activities to denote those performed in the field and in the homes of the elderly. Base and case activities are equally essential domains of work in a care assistant’s daily occupation. The partly collocated and partly distributed character of work, together with its organisational procedures, enforce a fundamental distinction between these aspects of the workplace. They do so as ‘dwellings’ of activities and in the way that the use of tools connects these locales. The work cycle includes locales that are ‘permanent’ and which have an internal organisation that serves as a ‘home’ for different sorts of work activities. Three different locales are identified. First there is the meeting locale, ‘the office’ where most resources are stacked and stored. Then there are the private homes of the clients. The third locale relates to the type of transport that is used. The means of transport varies a lot. It depends on the workplace geography. Transport could refer to anything from taking a walk or driving a moped, to using a bicycle or driving a car. All of these influence how a route is organised and, more importantly, influence the use of time and technology as well. Whilst the primary tasks guide the care assistants’ work, it is clear that the locales, where the care assistants deal and manage the secondary tasks of work, seem to have a stronger influence on the technology support needed by the care assistants.
Figure 4.4. Home care fieldwork illustrating some of the constraining factors the care assistants have to consider in their work. It is factors that effects articulation work and coordination activities. The influence of these factors varies locally as each district has a unique configuration.
The home care geography is a landscape filled with all sorts of aspects and factors that affect the processes where technology is used or being learned. But how does it influence the use of ICT? The following chapters explore the locales and activities which support the secondary objective of work, which take place in the geography of day-to-day home care work. From the above discussion, it can be seen that the care assistants leave information traces that others will find. These awareness strategies connect the work in different locales through tools and repositories, which provide the means to actively communicate a practical sense of knowing. The examples provided in the vignettes and the use of mobile phones and the group diary are further explored in the coming chapters. These tools seem to be chosen and used according to their ability to provide a form of structure in the mobile workplace. In the study by Orre and Watts (2006), we contended that fluidity becomes an important concept which transforms institutions into being less tied to places and where the activities become more fluid (Agre, 2001). This change was partly seen as a result of the way the utilisation of new technologies paves the road for flexible set ups in work. Moran and Anderson (1990) found that fluidity is an ordinary part of everyday organisation in office settings. Fluidity has from this perspective a depth which is hitherto unplumbed. Whereas one might consider fluidity to be a normal perturbation of office procedures, it is almost the reverse in mobile home care work. Procedure is a normal perturbation of fluidity. Here, sequentialisation of tasks and the ability to effectively manage some sort of temporal imagination (Bluedorn and Standiffer, 2005) is practical skills that is used to counter the volatility of the elemental activities to be performed.

That having or attaining a practical sense of knowing generates and capitalises on the active involvement of the care assistants, contributing to ongoing discussion and development in the workplace. Mobile ICT thus adds yet another feature and mode in a shared information space. This relates to the fact that home care assistants strive to continuously learn about each other’s activities. For obvious reasons, this also directs attention towards situations which will need to be coordinated (Mark, 2001). In this vein it is observed that the whole team has to adjust to proactive articulation behaviour in workplace activities. This behaviour enacted by the home care assistants also appears in how the use the diary, different binders, and even in computer files, which all hold information on the development of the care receivers. Mark (2001) sees such behaviour as having a normative effect on work place conventions, proposing awareness as a learning device. Heath et al. (2002) discuss the potential for providing the user with automatically revealed awareness information. They suggest that users could also be provided with tools which allow them to selectively and continuously generate traces of activities and actions which are visible to others in different ways. Thus, it is a
matter of consenting surveillance in order to be informed. However, as we see in this chapter, the benefits of sharing seem to be supplementary, which also is a suggestion that is in line with the idea that awareness is a learning device.

We contended that the conventions by which the use of such tools are either promoted or rejected seem to play a crucial role. This is especially evident when comparing the use situations of different tools. Diaries, computer applications and mobile ICT devices, such as PDAs and mobile phones, can be mapped to particular ideas based on conventions of convenience and utility. Within the architecture, these tools provide a freedom to act which is negotiated collectively. These conventions have their roots in efficiently maintaining orderliness and the well being of the elderly, and are followed rather than imposed by institutional regulations. The autonomy enjoyed by home care assistants at the time seemed to have contributed to the flouting of a clear organisational directive: do not use the emergency mobile phone for any purpose other than an emergency. Their practice knowledge led to an understanding of the likelihood and nature of any emergency call. They were able to exploit the device by virtue of the position in which it was held within the team structure; namely, central, always on and combined with transport. Furthermore, the fact that multiple devices (private mobile phones) could work with the emergency phone over-rode the disincentive of using personal property for work. They were only able to do this since a major part of their work relies on a keen understanding of its spatio-temporal nature and, arguably, the “culture of giving” that characterised this group of care assistants. Part of their practice knowledge involves recurrence: of route traversal, of particular people and their particular environments, and of procedures. The phasic nature of the work integrated with a phasic technology. Mobile ICT, such as mobile phones, has the flexibility to challenge these conventions as it is a technology which easily supports the transition between what we can defined as ‘base and case’ domains of work, where the former, the base, concerns the office and the latter, concerns the home care fieldwork. The use of the mobile phone clearly makes it is a case activity tool.

The observations that make up the vignettes in the previous sections reveal that home care assistants carry out their work in a variety of places in the work geography. Thus, home care work can be explained as a chain of activities in a sequential structure (see figure 4.3). Implicit in this chain is one house call; the following house calls add to the sequence of actions and so forth. Technology formalises this aspect of practice, but adds a formal start and stop button for different activities. The work shifts between being indoors and outdoors, and between taking place in the office and in private homes. Several factors thus have an effect on the accomplishment of activities. An important factor is the difference in conditions faced, depending on
the time of year. Such conditions influence the workplace and naturally affect how activities and resources are distributed and used. If it is snowing, for example, travel and walking time are bound to take a while longer. The changing conditions breaks the sequence and opens up for another explanation of home care which rather demands a focus on disruption and management of contingencies (see figure 4.5). The normal state of affairs is rather that the home care workplace has a volatile and fluid character. In home care, volatility is an inherent feature of the workday and is addressed by coordination and articulation of work. The fluid character of work addresses the need to adapt and adjust to the conditions and ongoing development of the elderly people’s situations. It means that the care assistants have to be informed. I have had several discussions with nurses about the sudden shifts and changes in patients’ health conditions on a hospital ward and the response time they have to work to accordingly. The decisions they make are not only based on the particular situation at hand, but also on the previous day’s situation, or even the day before that. As is the case for any care activity, home care also shares the ability to make timely and quick responses to people’s changing situations.

Drawing on these observations mean that the move from base to case is a dimension in which the practice support system including mobile ICT needs to provide a functional support in mobile cooperative work. These two dimensions are mutually dependent and it is crucial that the connections between them are acknowledged. The current shift in home care, going from an oral culture where people discuss their visits towards more of a written culture where each visit is documented, is not an easy step to take in light of the fact that mobile ICT facilitates talk and interaction rather than the documenting of routines. These observations also provide an explanation as to why care time is limited in the small self-organised work model. The work situation holds a certain complexity; a lot of time is spent on coordination activities. The home care geography also imposes constraints on how much care time can be squeezed out of the situation. ICT is currently deployed to address these problems, specifically in terms of reducing time spent in the meeting locale. It is also aimed at finding tools that more efficient than can possibly be managed manually to support the production of work schedules. Closely related is the observed factor of the re-occurring work cycle, which permeates the workday. It starts with the morning meeting in the office and is followed by a sequence of visits, and a break for either coffee or lunch before the next sequence of visits begins. My observation is that the spatial orientation of these activities has a direct effect on the use of ICT. This dimension seems to be totally ignored in most studies that focus on home care work. It is clearly a crucial contextual feature that should not be overlooked as it is seen to be related to care assistants’ use of tools and technologies.
Managing Articulation work

In most home care groups, the production and distribution of the work schedule is associated with the morning meeting. In some of the groups studied, the production of work schedules took 30 minutes, whilst in others it took up to one hour and, in some rare cases, even longer. Some groups do not even have a morning meeting, but these are unusual cases. The locale where the morning meetings take place is a central node in home care. As shown below, the spatial configurations of the three meeting locales play a central role in this study. It is important to make a mental note of how the furniture is arranged and where the computer is located as these are some of the features which influence the character of the assembly of the work schedule during the morning meeting.

These meetings naturally differ in length and in structure, but their common goal is to support the assembly of the work schedule. This section will explore the different strategies for schedule production supported by the use of a desktop computer. I will give an account of these strategies by presenting the different ways that the schedule is produced. In particular, I am keen to explore the role given to the desktop application in the procedure. These different strategies and configurations are presented both in the form of contextual descriptions and as vignettes. Each strategy and configuration has its own character and its style of presentation is chosen in accordance with the form that best preserves the spirit of the strategy.
Alpha - a cooperative-oriented approach

The first home care group to be visited was Alpha. Their production process is characterised by a cooperative approach. The different identifiable steps in the assembly process that are taken during the group’s morning meeting are listed in figure 5.1. A description of these steps is also given, together with an illustration of how the group is configured during the meeting. The configuration in Alpha holds that one person manages the desktop application and serves as the link between what is on display on the screen and the rest of the group. The desktop application offers a list of tasks that await action. Each task signifies a person under care. Each task is coded by a number: this signifies the person under care, instead of his or her name. It is thus an alias, which protects the identity of the elderly care receiver. The person managing the desktop application identifies the task (figure 5.2, step 1). Simultaneously, she calls out the task to the rest of the group (figure 5.2, step 2), but in so doing, does not address a particular colleague. Someone in the group then accepts the task (see figure 5.2, step 3), and the person using the computer drags the task from the list of tasks to the staff list that is also shown on the application interface (see figure 5.2, step 4). When the final task is registered, the work schedule is distributed onto the PDAs.

At the same time, there are discussions about the task, during which noteworthy details are exchanged among group members. Each time a new task is called, new energy seems to be added to the discussion. The pace of the calls is dependent on how the discussion develops. Some tasks generate a discussion which includes details that are relevant for the group as a whole: for example, “...456 came back from the hospital yesterday evening and we need to keep an eye on how she will manage at home...”. Other tasks might raise a recommendation to the person accepting a particular task, “I brought a new packet of hygiene gloves yesterday so you do not need to worry about that...”. The duration of the meetings are restricted to one hour, but the duration of the actual production of the schedule within that time slot is dependent on the “amount” of discussion the procedure generates in total.

“...The morning meetings are one of those highlights that Anne looks forward to every morning. When someone asks her what are the main reasons for her staying and working in the home care business, even though she often complains about the salary and the irregular working hours, her answer is always the satisfaction of contact with the elderly and the team work with her colleagues. The morning meeting is one of the few opportunities that the whole group meets before they carry out their daily activities. As she came into the room, she shared a joke with Agneta about their night out the previous week. Yesterday, she promised elderly 516 to book an appointment with the hairdresser, which she did. The time was set for Friday 3 pm and she sticks the hair
Figure 5.1. The meetings locales that are referred to in the chapter had the following configurations. The white book on each of the meeting tables in is the group diary, about which the use and transformation is discussed in more detail in chapter seven.
dresser’s business card with all the necessary information into the diary at the table in the meeting room. - Now, I will not forget to take her there, I have booked the time for 516’s hair on Friday... Carrie - you will work on Friday won’t you? Carrie who was sitting right beside her replied, - yes I will, was it about 516?... She mentioned something about it earlier this week... no problem...

The meeting usually takes an hour and during this time they can catch up with most of the important events that unfolded the day before. They also divide the tasks that are to be carried out during the day. Eve and Margret, who worked the evening before had added the note that 576 would need a re-evaluation of his service plan since his condition had got much worse over the last couple of days. - Perhaps it is time to get the process started to get him a room at Råbocken, (an old people’s home in the village) - if he continues to be this weighty...(Carrie added to the concerns that Eve and Margret were expressing...) - We cannot continue to have 5 visits a day for one single person...

There is also time to go through those records and files that relate to the elderly people she is about to visit. Usually, it is not necessary to go through those files in detail, since almost all information that would be helpful is discussed during the morning, but one cannot be too sure. Better safe than sorry, as usual. Fortunately she found out that elderly 413 was staying with relatives for the whole week. - Someone must have missed making a note about 413 and the fact that he will be away for the whole week... She immediately corrected the information on the desktop computer.

Agneta was very concerned about 534 and the rapid change in her health condition. - She was not looking well at all yesterday afternoon. Her eyes where blurry and she had a fever... - We consulted DSK (the primary care unit), and they agreed that we give her the medicine she has been subscribed (Eve added more information about the case, and continued...). - We have to observe her condition closely today. By the way, who will take her today? – I can do that, Susan quickly answered, - I will have to go to 489 anyway, and it is on the same route. Susan asked if there was anything more that she should consider regarding the visit to 534... - If her condition is worse, just contact DSK, Agneta added... - next 587... who will assist him today...” (The meeting is prolonged through the articulation of work and a simultaneous discussion about the care receivers.) (This vignette was earlier presented in Orre and Watts (2006))
Figure 5.2. The way articulation work is managed in Alpha is revealed in the contextual image above. Note here the interaction the care assistant sitting by the computer initiates by calling out the different tasks out loud anticipating a quick response from her colleagues.
The person managing the desktop application does not decide which of her colleagues will deal with a particular task. When a task is called out, it is more of an open question that is intended to be managed by the group as a whole. Two aspects are of relevance here. Firstly, the core group of elderly that need attention on a daily basis is known and the team members have a clear idea of who they would like to visit that particular day. Whilst it is a system that could be open to cherry-picking, this does not appear to be an issue here. Rather, the care assistants strive to achieve variety in the house calls they attend. If a team member does have a ‘most-wanted list’ in mind before the meeting each morning, the culture of flexibility and compromise seems to prevent conflict. There is a verbally shared goal and agreement within the group that every team member should be able to take care of all the elderly within that team’s responsibility. Alternation in the sequence of house calls thus maintains knowledge about the elderly person’s situation through experience. Cooperation within the procedure serves to make sure that appropriate and noteworthy information is exchanged in order that the team members continuously maintain a common ground through the alternation of visits and experience. The role of the desktop application here is to provide a structure and to keep “minutes” of the meeting as the schedule is put together. The automated list of tasks is thus one important structural aspect in the support of group dynamics within the meeting. A particularly interesting aspect is that, whilst the meeting as a whole might take one hour, the production of the work schedule only takes about 20 minutes of the total meeting time.

**Beta - a delegated approach**

The desktop application described above is also used by the Beta home care group. As in Alpha, the list of tasks is automatically generated and all that remains is to produce the work schedule. In Beta, the responsibility of producing the work schedule alternates between the team members and is delegated to one or two people. The background to this approach is a belief that alternating the duty of work schedule production would give all the team members some experience of using the desktop application and the computer. I therefore see this approach as a computer delegated approach. The team member assigned to the task used to start their workday half an hour before the arrival of the rest of the team and before the start of the morning meeting. This arrangement was originally intended to ensure that the work schedule was ready for distribution before the start of the morning meeting. However, it resulted in a number of problems being reported, which in part can be seen in the vignette below. Consequently, the work schedule is now produced later in the morning or during the previous afternoon. However, there are always some last-minute changes that have to be done before the
work schedule can be distributed. In a sense, then, the work schedule cannot truly be finalised.

The schedule is produced from scratch, both in Alpha and Beta. Schedule production is a complex process which involves the organisation of around 40 to 55 house calls each day. Some 40 percent of these calls need to be attended to during the morning and, in most cases, the planner deals with tasks that involve strict time dependencies. The complexity of the task lies in an array of variables and dependencies that have to be dealt with in a strict time limit. I will illustrate the situation in Beta with a vignette that presents the morning meeting. The vignette given below provides a realistic account of a situation in which Beta's work schedule is produced. This time, however, it is from a perspective which directly focuses on the production of the schedule. We follow Mary during the morning meeting. She has been part of the team for about ten years and when she arrives in the office we find two of her colleagues, Doris and Alyssa, working together to produce the work schedule.

“...Mary notices that Doris and Alyssa sit by the computer producing the work schedule as she passes by the open door to the meeting locale, heading towards the lockers. It is Mary's turn to produce the schedule tomorrow, but today she will just work out the work schedule during morning coffee. They have agreed upon an alternating arrangement that takes care of tasks every morning and those responsible start work half an hour before the rest of the team, which means half an hour before the 7.30 am regular morning meeting begins. The first administrator attends, together with their group manager. They usually discuss any special events from the day before. The work schedule will also be distributed during the meeting, as soon as Doris and Alyssa are finished. Mary takes a seat on the sofa and places her cup of coffee on the table. She picks up the team diary and reads yesterday's comments; she is surprised by all the 'new' tasks that are scribbled on sticky notes attached and that will need registration onto the computer this morning. Alyssa and Doris work in silence, only disturbed by the tapping of the computer keyboard. Mary decides to interrupt the two at work. As Mary gets Alyssa's attention and shows her the sticky notes, she says - you should consider these in the plan today... and hands over the diary to Alyssa and Doris. Doris draws the outside of her hand across her forehead. - Oh dear, we have totally forgotten about those. The sticky notes that Mary found in the diary concern tasks that either need to be added or withdrawn from the task list. The proper procedure should be to register these changes in the desktop application the day before. But some of the members of the team are still reluctant to use the computer and make changes to the data it holds. These changes affect the conditions for the production of the work plan. The silence at the computer is replaced by humming and half-finished sentences which are connected to the sticky notes found in
the diary. Mary notices that Doris is totally focused on the task at hand as she considers the sticky notes given to her. She also notices that Doris starts to produce her own notes, which seem to serve as scribbled memory cues, and she puts these on the desk and on the edge of the computer screen. Brigitte joins Mary, who hands over the diary for her to see and says, — there was not much commentary yesterday and puts the diary back on the table again. Brigitte agrees and asks Alyssa how work with the schedule is going. - It is difficult today, the sticky notes you see, and Elsa called in sick earlier... She is interrupted by Doris who asks Brigitte if it is okay for her to take number 568 after lunch, instead of before. - It would make it easier to work on the plan before lunch. Brigitte agrees to the change at the same time as the administrator, Lisa, and the rest of the team enter the room. The morning meeting will soon begin and Mary asks Doris if the schedule will be ready in time. - Unfortunately, we are only two-thirds through, so you’ll have to do without the schedule during the meeting. Lisa starts the morning meeting with briefs about any coming changes that concern work routines at the care home. These will mean that some of the team members will also have to incorporate the care home into their rounds. She also presents a forthcoming lecture that concerns care work and vascular dementia, which is part of competence development activities within the organisation. - So, was there anything out of the ordinary yesterday that we need to discuss? As there was not much ‘out of the ordinary’ to report, the meeting starts to wind down and people start to get ready to leave the meeting locale and get on with their work. Doris, who has been working on the schedule throughout the meeting, is just about to print out the schedule for those that do not use the PDAs...

The description as to how the computer is used in the scheduling procedure is different to that found in Alpha. What is most interesting is that the same application can be used in two very different ways. In Beta, the desktop application is the responsibility of one or two people and the task is complex. Here, it is noticeable that the production of the schedule is kept separate from the morning meeting; it is even produced concurrently with the ongoing morning meeting and many other related activities. The work schedule should be ready for distribution before the meeting begins, but it is not. The workgroup may well lack a well thought through strategy. However, the observations offer an alternative tentative explanation; that Doris and Alyssa and the rest of the group do not have an adequate knowledge of how to use the desktop application. They struggle with the difficult planning work and the application at the same time.
Figure 5.3. The way articulation work is managed in Beta is revealed in the contextual image above. Note here that there is little interaction between the care assistant sitting by the computer and her colleagues waiting for their work schedules.
“...On the screen in front of them they have a window in which all the valid tasks for that day are displayed. It is a drag-and-drop procedure which goes: identify task, activate task, hold mouse button down, drag the task and assign the task to chosen staff by dropping onto his or her name in the staff frame. One could think that this is a fairly easy task to handle, but it is not. They need to deal with a complex web of time dependencies, preferences, requirements, rules 4., all needing to be considered in order to produce a work schedule that is seen as reasonable for all colleagues involved...”

As we can see in the vignette, a lot of different resources are used in the process of producing the work schedule: the group diary, sticky notes and even straightforward questions to colleagues had to be consulted before the work schedule could be completed.

“...Doris seems to discuss different alternatives with herself. Alyssa is totally left out of Doris’ one-to-herself discussion, although she tries to make suggestions about how to proceed on a couple of occasions. Doris does not listen, however, and remains totally focused on the task. She even starts to use sticky notes as scribbled memory cues that she puts on the desk and the edge of the computer screen. Soon the production of the work schedule involves a complex web of sticky notes as well as the desktop application...”.

The delegated approach seems to generate a lot of stress and frustration. In the past, this was remedied when care assistants in Beta learned how they could go about solving the planning task and when administrators understood that new routines had to be implemented. Whilst the vignette presents an early transformation stage, it does represent a crucial situation that can be associated with the introduction of new technologies in an organisation where the knowledge of use is low and unevenly distributed among the members of the organisation and the workgroups.

**Gamma - an automatic-oriented approach**

The production of the schedule in Gamma differs again from the examples of Alpha and Beta given above. The most significant distinctions are that the desktop application is used differently and the production of the work schedule is not connected to a formal morning meeting: indeed, they are two separate activities. One reason for this is that the organisational arrangement differs slightly from the two cases given above. The main difference lies in the fact that the work schedule is produced by dedicated schedule planners (Orre, 2006). The schedule planners do more than just plan: they also carry out home visits and are as much involved in everyday activities as any other member of the team.
“…Emma works in the same team as Eric and they have done so for a long time. - We know each other inside out and we can immediately see how things are without asking any questions, Emma says. Eric and Emma are members of workgroup RED at the downtown home care department and they meet up at the office approximately half an hour ahead of the short morning briefing. This half of an hour is outside what counts as working hours. Before the planning module was introduced they planned the work within the workgroup, and during those meetings there was also time to discuss difficult situations and to ask for advice. They usually share experiences and give practical tips on how to approach certain house calls, using the work schedule as a structure for discussion. The schedule is printed on paper and then distributed, and most of the details about each elderly person are on display in these. Eric usually writes down the names of the people on his work schedule. - There is too much information on this print-out to bring along, he says, so in our workgroup we use these notebooks instead. Emma does not agree, she likes the print-out more and more, - it is difficult to avoid it nowadays. When all the members of the team, which besides Eric and Emma also includes Steven, Mey, and Karen, have arrived, they discuss the coming house calls. They do not discuss every case, only those they see to be in need of extra attention. Steven brings up Mrs. Karlsen’s toilet. - Remember to turn on the toilet water tap before you let her use the stool. I have closed as twice in recent weeks, she has tried to flush her diaper down the toilet, with rather expensive results. So we’d better close it and save her some money… - I agree, Mey replied and continued, - I will see to that it is closed afterwards… a fiendish solution you came up with there by the way. Eric pointed out that Mr. Olsen’s Alzheimer had gotten worse over the last month. - We should recommend that he gets an apartment at the care home soon, he will be better off there than home alone, would you take that up on Thursday when you meet Anna? (Anna is the assistance officer that regularly discusses care-planning issues with the team; Thursday is Eric’s day off.) - We will, and I will ask how Mr. Olsen is feeling today, he might give some more input, Emma replies. They finish off their coffee, Mey sees if she can get hold of one of the mobile phones that is available, Eric picks up his notebook and puts it in the outside packet of his backpack. - See you later then…”

Schedule planning is a role which has a clear area of responsibility and each schedule planner is allocated five hours a week for planning activities. It is a new role that was introduced along with the desktop application and formed part of an overall initiative to save time in scheduling planning. The time spent on morning meeting activities could be reallocated and used for early house calls and other productive activities instead.

“…Anna sits in front of one of the desktop computers as she does the last changes to the work schedules that soon will be distributed
to the green, red and yellow workgroups. She has been responsible for this day’s schedule. Tomorrow Eric will be responsible. Eric and Anna are currently schedule planners and have had that role for about a year now. They have a couple of hours of their time allocated for planning tasks, alongside their ordinary rounds. One of the corners of the room is nowadays converted into a small office space with two desktop computers and a printer. A divider screen separates the office space from the rest of the meeting locale. One computer is dedicated for planning work while the other is used for documentation of house calls.

“...Eric and Anna use different strategies when they use the planning module. While Anna prefers to approach scheduling by pushing the OP button to produce a good enough draft schedule, and then from there proceed and make adjustments accordingly, Eric on the other hand, manipulates the variables which the planning module operates while producing the schedule. One needs to know how the variables co-construct the schedule, and let the technology do the work for you. It is better that the system itself is accountable which is simple, you just configure the variables in a proper way. According to Eric, Anna’s approach is a typical example of a female way of producing the schedule...”

“...Anna does not at all share Eric’s view. She is often disappointed with the result that Eric’s approach produces. It is especially the case that experience and knowledge about particular house calls are not considered in a way that Anna sees appropriate. She says that it is important to provide your colleagues with a workday that only reflects a fair amount of work, but also that negative routines can be broken and positive routines retained. For Anna, this means that she keeps track of the unfolding events in the group, and yes, she admits that production of the schedule is cumbersome to manage practically because of this. It is even an activity that holds a lot of stress and pressure given the position that both Anna and Eric were given when they voluntarily accepted to ‘take care’ of the planning work...”

The schedule planners strive to keep a planning horizon that looks at least three days, or sometimes even one week, ahead. The work schedules are, however, not ready until the last details are in place for the particular day the schedule is to be distributed. Critical events apply in particular to workgroups. These include getting access to convenient transportation. People calling in sick is also a critical and reoccurring event, as are last-minute phone cancellations by people expecting a visit. Besides the morning hustle and bustle, which at times can cause major revisions to the schedule, the schedule planners also strive to produce a work schedule that is as evenly distributed as possible. Work scheduling is a difficult task in itself: not only does it involve having to compromise with one’s peers, planners also have to deal with the criticism that completed work schedules usually give rise to. It is also a task, which puts the schedule planner in a position of authority, with
a more direct influence on other people’s work than that of, for instance, the formal manager.

In Gamma, schedule planners can be seen to follow three different strategies. The procedures of planning can be described thus:

- Making work schedules from scratch, like a jigsaw puzzle.
- Making work schedules in the same way as a jigsaw puzzle, but with the support of an automated aid that generates an acceptable starting point. The planner starts the procedure by pushing the “optimised planning” button, and makes any necessary corrections.
- Making work schedules by manipulating the automated aid rather than the schedule itself. If all meta-information about all visits and available staff are correctly filed and the interrelations between the variables considered by the planning engine are understood correctly, an acceptable result will emerge.

The outcome of the procedure - in other words, the work schedule - is distributed on paper, as well onto mobile devices to the rest of the team. It is at this point that the morning meeting begins. In many ways, this resembles an earlier tradition of morning meetings. The schedule is distributed and it forms a centrepiece during the discussion that follows. The discussion mainly concerns the schedule and the assigned work, and it takes place around the team tables. Members of some teams even exchange house calls in order to adjust or correct the work schedule to fit their requests, but also, it seems, to show that they still have some authority and control over the plan of work. In the teams that use mobile devices, team members either download the work schedule and start work the minute they leave home, or pick up a print-out of the work schedule from the office and, at the same time, meet colleagues. The latter is the preferred option, as the meetings and social contact with colleagues are clearly seen to be important. Access to the print-out of the work schedule also plays a role here. It is said to provide a more comprehensive overview of the information details than that given on the display screen of the mobile device.

**Exploring Abandoned Procedures**

One important avenue of thought which I explored during this study was that new technology is judged by comparison to that which it replaces (Berg, 1997). As has been said earlier, new technologies are introduced into a web of existing tools and technological supports. To understand how they influence the use of what’s new, it is also necessary to look at how tasks were solved before. Consequently, in this study I adopted the approach of following the technology (Marcus, 1996); in this case, from the Tarfoil board to the
Joliv and the TES systems presented above. A common denominator between the three care practices is that they have not previously been used as computerised tools to support the planning activity, albeit, with the exception of an opportunistic initiative by one workgroup in Gamma. In all care practices, each workgroup built their own routines to support the planning activities and interaction within the workgroup.

In the early stages of the fieldwork, discussions about how things used to be done directed my attention to what the care assistants called the Tarfoil board (see figure 5.4).

![Figure 5.4](image)

**Figure 5.4.** The Tarfoil board attached to the wall is or has been a general coordination tool in many home care workgroups.
The concept of the Tarfoil board implements a traditional division of labour matrix structure. The horizontal axis indicates time, represented by days and weeks. The vertical axis represents a list of personnel, which in turn could be divided into teams or other configurations convenient for the particular setting. Tasks and assignments are represented by coloured pieces of paper, which can then be distributed evenly between group members. The Tarfoil board can, however, only perform the first stage in the planning process, namely the development of a rough structure. To complete the coordination task, the care assistants have to divide the paper notes evenly between themselves, a task they describe as being like dealing playing cards.

Figure 5.5. The use of the tarfoil board differs between the groups. A notepad is used to keep track of how the distribution of the different tasks pan out during the morning meeting.

One of the group members distributes the tasks by saying out loud a specific task and the client concerned and one of the others accepts the task, noting it down in a personal calendar or notebook. Since only an hour is available for the morning meeting, coordination activity needs to fit within
this. Despite being part of different organisations, the two groups share the background and culture which surrounds the Tarfoil board.

In Beta, I found another variation on the Tarfoil board. It was a portable device that fitted neatly on the meeting table. The described procedure for using the tabletop Tarfoil correlates with Alpha’s wall-mounted Tarfoil board. The convenience of the tabletop version was that the manager could prepare the Tarfoil notes in advance of the meeting and in any location desired. There was thus a flexibility connected to the use of the tabletop Tarfoil. It could well have been even more convenient than the wall-mounted version, since it provided an overview of the workload at the actual meeting table. The way in which it was used was not very different from that used in Alpha.

In Alpha, the Tarfoil notes were moved from the board and brought to the meeting table. They were then distributed and the assignments were noted on personal planners before being brought back again. Here, three separate workgroups shared the same Tarfoil board. In other workgroups in Alpha, each workgroup had its own locale and each team used the wall-mounted Tarfoil board, but with the difference that the notes were not removed from the board. Instead, the relevant house calls were recorded using a note pad. This note pad was then used to facilitate the planning procedure at the meeting table. This is yet again an example of subtle differences in the way that the planning task is managed in practice. In the workgroups in Alpha, planning was more verbal in character, was managed by people gathering around a note pad and the tarfoil notes. The note pad was used in a way that, by and large, resembles the way that the portable Tarfoil board was used in Beta. I also found similarities with the approach utilised in Gamma’s workgroups, where note pads were used as a shared space to facilitate the activity. An examination of the procedure that surrounds these coordination tools should take into account that personal planners and note pads are still important tools: they act as a support in the planning procedure, in which people seem to have a real need to establish a structure that both supports and facilitates an effective and shared planning process. There is a danger that the role played by these tools in coordination activities are either forgotten when new tools take their place or that people continue to use them, adding to the web of technologies used in the planning activities.

The workgroups in Gamma have no experience of using a Tarfoil board. Instead, each workgroup has used a self-produced system that supports the production of work schedules. Earlier planning systems have included the use of notes pads, personal planners and special notebooks. In part, these systems are still in use today. Every work team was shown to have their own planning routines and the local production of coordination tools point to-
wards a need for an overview that facilitates the planning procedure. Each morning, the work teams recorded a list of valid house calls into their note pads from a variety of different information sources. The resources were found in paper documents (newly arrived care cases) and in binders, which held history and information about the house calls for which the team is currently responsible. In some work teams, lists and coordination repositories were opportunistically developed in MS Word using a table-based structure. A print-out of such documents was then used during the morning meeting to facilitate the planning procedure. The work schedule was written down each morning in team members’ personal planners or notebooks. This served both as a reminder of which calls were to be attended to that day, but also as a personal work history. The personal planner and notebook are both examples of general tools that are still in use among all the work teams included in this study.

**Shared Tools and Collective Practices**

It can be observed that the location and use of the computer application differed between the three care practices. An explanation of the transformation of base activities in home care can be found in the retrospective study of how people involve and use their newly implemented computer system in their meetings. The observed meetings are not opportunistic or unplanned; rather, they are a regular component in day-to-day work and play a crucial role. Whilst the care assistants need to be mobile and be able to operate in a vast working area, they also need a place that provides structure and social interaction with their peers. In order to be as efficient as possible in field activities, a lot of emphasis is placed on providing tools for planning to ensure that available resources are used as efficiently as possible. The general rationale seen from a planning perspective is that it gives a structure and support to articulating work tasks. The semi-automated planning module provides the care assistants every morning with the house calls that need attention during the day. However, the care assistants need to articulate and distribute the tasks themselves. Two factors that these home care teams share are: the workflow and document system used to assist day-to-day work activities; and the central role played by this system during morning meetings. One care practice, Alpha, exemplifies a collective practice in the way that its care staff divide and co-ordinate their work as a group each morning. Indeed, the procedure is similar to that found at an auction and similar to the way that the Tarfoil board was used: it has a cooperative character. The second and third care practices, Beta and Gamma, exemplify a situation where the division and co-ordination of work has more of a directive character for the whole group. In Beta and Gamma, planning work is delegated for two
quite different reasons to a limited number of staff. The way that the computer is involved in the activity clearly hinders collective coordination.

The coordination styles found in Beta and Gamma are more reminiscent of a traditional office set-up. However, in the first care practice, Alpha, we found a coordination style in which the computer is enmeshed in the whole group’s activity. It can be observed that the bidding process found in Alpha emphasises discursive behaviour which involves the computer in the whole collaborative activity. It was found that, in the second care practice, Beta, the directive character of the coordination activity resulted in silence and closed activities. Instead of addressing her peers, the person planning and articulating the work schedule asked questions of herself, with her peers sitting passively awaiting their work schedule. Such a solitary approach is aimed at dealing with the issue of articulation work, but seems to exclude a discursive behaviour, and this seems to be reflected in the seating arrangement. This is a strong deviation from the way in which articulation work used to be managed by these groups, when they used the Tarfoil board. A similar situation is found in the third care practice, Gamma. Here, however, the planner produces the groups’ work schedules in advance. The completed work schedule is distributed on paper when the care assistants arrive at the office. The care assistants discuss these work schedules and, in some cases, even exchange visits and alter its structure in a way they used to do before TES was introduced. A comparison of these three care practices reveals that the planning activity takes place in the same location as the computer or, as in the last example, where the work schedule is used. In all these cases it is relevant to consider the seating arrangements and the location of the computer chosen by these groups for their co-located meetings.

The original planning meetings in these care practices, prior to the introduction of the workflow software, were very similar. All three organisations had a number of small groups which served some of the elderly care receivers and were managed by self-organised meetings prior to each shift. The difference between the morning meetings of the three groups following the introduction of the new technology are as follows. In the first care practice, Alpha, they have retained the collaborative bidding process. This has been modified from the original paper-based system, but now includes the new technology. On the other hand, in the second care practice, Beta, the work-

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6 From group interviews, it was discovered that the board per se was not the whole ‘reference’, rather it was the collective practice associated with its use that played a central role in their discussions and by some of the groups what was considered lost in their use of ICT. Similar types of board have been a common factor and trait shared between many home care organisations. Here, the board was usually mounted on a wall in the meeting locales, or as a more portable version to be used directly on tables or wherever needed. It was a convenient and easy-to-use coordination tool for small home care workgroups.
flow process falls to one or two people and, although it takes place in the presence of the other group members, does not involve or engage them in the process. In the third care practice, Gamma, we see the introduction of a new formal role, the schedule planner. The result of this is that in Alpha, where group involvement is much fuller than we find in Beta, more incidental information is passed between team members. This allows them to pass on facts which are more immediately useful, as well as offering a better environment in which to promote reflection on professional practice and behaviour. The type of organisation found in Gamma exists in the majority of the studied teams’ meetings: they are similar in character to those in Alpha, but have a desktop application set-up which correlates closer to Beta. So, why has this happened? Orre and Middup (2006) we offered an explanation which considers the collaborative dimension of the practice within their concept of collaborative spheres. The dynamics in these spheres is illustrated in Hymes (1974) classification of group communication and interaction and serves as a useful guiding scheme to dismantle collective articulation of work.

One design principle that effectively represents the tension generated when attempting to fully integrate computers into a group environment is the concept of semiformal systems (Malone, 2001). The principle assumes that computers will not have the same cognitive capabilities as humans. Simply stated, semiformal systems are systems in which the boundary of task responsibility between computer and human is a flexible one. The idea of semi-formality is that the computer will process information in a variety of formal ways and humans will process information in a variety of informal ways. The boundary is fluid to maximise both approaches, but in a coordinated manner. In the three organisations under study, the semiformal boundary of the system’s interaction with the group, in addition to the specific physical layout in each case, led to what could be described as spheres of collaboration (see figure 5.6).

In Alpha, all the group members remain involved in the task and are still able to influence the nature of the collaboration, despite the fact that the semiformal boundary exists between only the operator and the computer. In this case, the group have established a routine where the interplay of the computer and group members resolves itself into a single sphere of collaboration (A), where the bidding process is driven by the computer operator, but cooperatively involves all the other members of the group. Because a single sphere exists, the benefits of the group’s meetings prior to the technical intervention are preserved with the introduction of the computer. The computer operator is able to distribute to the rest of the group those parts of the cognitive properties which are inherent in articulation work. Then all mem-
bers of the group involved in the sphere can see how to manage the necessary coordination of the tasks during the auction.

Figure 5.6. Each workgroup managed articulation work in ways that in many respects show many similarities. What differed was the discursive character of the process. This work process is shaped by Collaborative Spheres (Orre and Middup, 2006), which pay attention not only to the articulation task, but also to how the position of the computer and the general configuration or the meeting room affect the process.
What the computer operator does is initiate and close the tasks, in that through her call she delivers each and every coordination cue to the group. The coordination tasks are left to the group members to solve as they best see fit and in accordance with circumstance. Thus, the sphere of collaboration signifies the potential to support the completion of complex coordination tasks which this group has learned to utilize to their advantage. At the same time, they still keep the discursive nature of the meetings. By comparison, in Beta, two spheres of collaboration are formed, (B) and (C). In one (B), two members of staff use the computer to develop work schedules for themselves and the other members of staff in the room. However, the other members of staff are not involved in the planning activity and have their own sphere of collaboration (C).

Figure 5.7. The care assistants in Alpha awaits the 'morning task auction'.

This split in the group results in the loss of some of the informal prompting that existed prior to computerisation and, therefore, much less information about the elderly care receivers is passed between the home care staff. The planning task in home care is complex and the cognitive properties are, in this case, not distributed to other members of the group. The person in charge of the input devices takes full responsibility for the task and only occasionally asks her colleagues for advice or approval of how a certain coordination cue is handled. This directive way of handling the planning task excludes the discursive nature of the morning meetings and results in the emergence of separate spheres of collaboration through the group’s routinised use of the computer. In (B), the cognitive properties exhaust all attention on discourse, while in (C), no structure and no cues are offered in order to promote it.
The situation in Gamma shows yet another example that is found in the first two care practices. The role of the planner is of course a central resource and differing factor. But what is interesting is that the observations made in Alpha and Beta are confirmed by the situation in Gamma. When the planner manages to produce the schedule in time for the meeting, the schedule is used to give structure to the meeting and to provide a discursive orientation on the meeting: a sphere of collaboration is formed. In some groups, the care assistants re-negotiate the schedules that are distributed and exchange clients by making annotations on the paper schedules. But in situations where the last-minute changes to the work schedule take too much time, the directive character is more prevalent than the discursive. In fact, everything is observed to be set on hold while waiting for the schedule to arrive. In Gamma, the workgroups are deprived of their earlier influence on the work schedule, which functioned as both structure and meeting engine, a situation which was also found in Beta’s morning meetings. Some of the workgroups in Gamma seem to have managed to restore and find tools that fill this vacuum, but the majority of the workgroups are still looking for that sort of support.

**Different ways and different outcomes**

It seems to me, that the examples given above show that work cultures influence and change the way we use technologies. The ways that these different work groups chose to approach new technologies also reflects the wider context to which these groups belong. While focusing on these three care practices, it seems that different ideals have guided the introduction of the new technologies. An ideal that places a lot of emphasis on traditional managerial control can be found in Gamma. For example, in most of the workgroups in Gamma, planning was taken out of the daily routine for most of the group members. Instead, one or two group members in each workgroup were delegated exclusive responsibility for planning work. The effects of this approach are that new roles have emerged in the workplace. The best example is the planner role. Although the schedule planner role is not given formal authority by the administrators, by having control of colleagues’ work schedules, it has become central within the home care districts. The district managers are heavily dependent on a good planner, and a planner always has to work on two fronts, as she/he stands between the district manager and the workgroup. The automatic-oriented view on the planning process seems to make home care more individualistic and impose more control on the group. In the process, the workgroups are deprived of the tools and resources that used to provide the structure and support for mutual sharing and exchange of experiences. Instead, they are offered tools that constrain opportunities for action. At the most extreme level, this could result in a
situation where a care assistant only has to walk to the office, pick up the schedule and start work, a process which provides minimum interaction with peers.

The other ideal focuses more on finding a remedy for problems associated with fragmented information repositories. In Alpha, a cooperative-oriented view on the planning process seems to have sustained a collective character in the discursive practice. The effect is that it has either maintained or strengthened the sense of group-belonging among the group members and it makes the members both share and take more responsibility. As an effect, the care assistants individually specialise in a particular area for the benefit for themselves and for the group as a whole. This role-taking behaviour is natural to small groups in their dealings with complex tasks, and also indicates that the workgroups in Alpha enjoy a certain degree of independence and autonomy. It is of course not an unproblematic approach, and I would suggest reviewing it critically. One problem that is observed is that it produces strong workgroups that from a managerial point of view might be difficult to guide. It is also a work culture that clearly demands a lot from a person in terms of a willingness to work both independently and collaboratively with others, in order to be functional in the everyday practice of the workgroup. It is a work culture that some find stimulating and this can lead to a care assistant actively applying to become a member. On the other hand, a care assistant may seek to avoid becoming a member. It is in such an environment that the cooperative-oriented approach has to be understood.

Technology introduced into co-located group settings for efficiency purposes can have a negative effect on group socialisation, unless the purpose of the meetings is understood to be more than a simple analysis of the headline task. Signs of such effects should not be taken lightly. A crucial arrival point is the role of historical and cultural dimensions associated with applied tools. The legacy of previous ways of dealing with coordination in a cooperative activity was shown to hold crucial information on how an ICT support might be introduced. It also raised the question of how we can move beyond the office paradigm in our use of office computers and the implications of such steps. Home care becomes an example of an intersection between the survival of traditional ideas on computers and their use, and those behaviours which belong to a new paradigm. In attempting to address this new paradigm, it is possible to argue that the particular way in which an IT support is deployed accommodates social dynamics. In this chapter, discussion relates to either giving the meeting a directive or a discursive character. Different coordination styles in the three care practices are then identified, together with the automatic-oriented approach, a delegated approach and cooperation-oriented strategies with which the workgroups can be seen to approach the new technologies. These strategies provide people with differ-
ent capabilities for interaction. Furthermore, some of these strategies provide people with more capabilities and others with less. As a result, the strategy developed for the introduction of ICT support is shown to be critical. It concerns activities that build the ‘collective mind’ (Brilhart, 1967). The degree of influence directing their own activities is seen to be put at risk, thus the degree of autonomy and control the workgroup onwards will enjoy (Bluedorn and Standifer, 2004).

Spheres of collaboration is proposed as a vehicle and concept that has a potential to support and promote strategies for the management of digital technologies in co-located meetings (Orre and Middup, 2006). From this observation of the work groups and organisations, it is possible to argue that, when a technological intervention is integrated into existing team meetings, the spheres of collaboration that exist amongst co-located groups should not be modified in ways that allow the loss of less tangible, but often highly effective, group interactions. In the organisations observed, the main task of the meeting had been analysed and effectively replaced as part of a wider technological development. However, only one of the organisations had managed to implement this in a way that retained the other, less formal and less structured, parts of the meeting. It is difficult to argue that the organisation that accomplished this intended to do so, but the examples given above show that these support technologies can be used in radically different ways, with radically different outcomes. These support technologies seem to produce different effects, depending on how they are used. This point is of great importance. The situation observed in Alpha is different to that observed in either Beta or Gamma. I found that the care assistants in Alpha were more autonomous as a group. They had more control of their work schedule and could influence their workday to a higher degree than the workgroups in Beta and Gamma. By observing people at a distance, it became clear that the ways and thoughts that guide how new support technologies are used differ between the three care practices. In Beta and Gamma, these create a situation where people slowly lose the means to directly influence and control their workday. In these situations, new work roles emerge. One such role is that of the planner which, due to the crucial role the production of the work schedule have, is becoming a key post in its own right. Hence, planning, i.e., articulation work, becomes a specific skill in its own right, or even a skill based on the most efficient use of Joliv Mobile care or TES.

The planner in Gamma and Beta has a dual role in the workgroup. He or she is a colleague who tends to house calls in the same way as any other member of the group. But the planner is also the person in the group who is in control of other people’s work schedules. Whereas the planner enjoys more control, the workgroups gradually lose their autonomy. This is an apparent change in the landscape of authority. A person in the team is given a
role that gives them more power to influence co-workers’ workload and content than that of any administrator in the care practice. Being the planner makes the person a gatekeeper for both administrators and peers. It is a situation that will create new paths of decision-making. Moreover, the administrators will become dependent on a good planner. In Alpha, workgroups manage the planning work collectively. Here, it is observed that although some members of the groups take on the role as coordinator of the morning meetings, this does not make them planners. The responsibility and the complexity of the planning task is shared within the group. In Alpha, it is difficult to identify emerging roles, such as that of the planner in Gamma and Beta. The situation is that the workgroups enjoy a strengthened autonomy. An assumption is that the administrators in Alpha thus need to have a relationship with the workgroups that keeps their autonomy in balance at the same time as they are given suggestions and direction. What is clear here is that the autonomy of the workgroups and the control they govern is challenged and reformed through practical use of these support technologies and it is a process where subtle dimensions of practice currently are transformed.
Using Mobile ICT at Work

When observing people as they carry out their work and use mobile ICT, it soon becomes clear that home care work almost always means working in the homes of elderly people, and moving back and forth between different locations. Mobile ICT has, therefore, the potential to support the distributed character of home care. Advocates of mobile ICT have long argued that mobile devices would most efficiently support the documentation of work and provide an alternative milieu to the traditional office. Documenting work would be possible at the point of care. Other than mobile phones, care assistants have never before had support technology that was specifically designed for the case work they do. The observed role of mobile phones in home care work will be more thoroughly discussed in later sections of this chapter. Documentation has not always been a mandatory activity in home care work. It is a task that has resulted from the modernisation of home care and the demands set by politicians, administrators, the elderly themselves, of course, and their relatives. Home care is today a fairly document-intensive activity. Documents are crucial components in knowledge transfer activities and those that secure the quality of work (Eliasson-Lappalainen and Szehely, 1998; Hedström, 2003; 2004). The use of mobile ICT in home care work would further strengthen continuous documentation activities and refine the written care history of each elderly person under their care.

Computers in home care administration are now commonplace and in most home care locales you can expect to find a computer standing in some
corner of the office. A traditional office could be described as an interactive amalgam of information, people and artefacts working harmoniously together; at least this is the case if we follow the definition formulated by Sellen and Harper (2001). This description certainly applies to the home care offices seen and experienced during this study. However, the office in a home care organisation is different to other types of offices in that a well-used home care office is an empty office. Sellen and Harper advise us against adopting approaches in which laptop computers and PDAs are seen as information windows and novel communication devices which act as silver bullet technologies to distribute office activities. Such approaches are, they say, far too narrow and focused, since an office is not simply an interface for information (Sellen and Harper, 2001, p. 191). Their warning relates to a risk of eliminating work cultures that permeate the use of resources in an established office.

Home care fieldwork has not involved much in the way of advanced supportive technology, such as mobile ICT. This chapter will explore the use of mobile ICT in detail. Mobile ICT can encompass many features and a multitude of different devices. I will use the term PDA and mobile phone in order to be more specific about the kind of device being used. At the start of this study, few PDAs had a phone feature and few mobile phones offered PDA features. The care assistants had to manage at least two devices on a regular basis. The focus in information management is evident and, as this chapter will go onto address, also problematic. Mobile ICT can be used as an administrative tool. In this situation, I have followed “anticipated activities” in which mobile ICT are supposed to be involved. Such activities mainly concern those tasks where data is captured as time studies, register-accomplished tasks and documentation. This view reflects what is required of users. The result, however, shows something radically different, and it is because centralised information is distributed on several devices that mobile ICT becomes a potential support for both individual and collaborative work activities. I have explored this feature from the point of view where mobile ICT is used as a shared information space and looked at how such an information space supports everyday collaborative practice and interaction.

**Exploring mobile ICT as an administrative tool**

Previously, care assistants did not have any field support to help make effective documentation possible. At that time, home care was seen more as a home help service than a ‘qualified care practice’, and it is only during the last ten years of transformation that the documentation of work has become a mandatory task. Documentation concerns care activities, rather than tasks which relate to cleaning, shopping for groceries, and so on.
New technology centralises the information in home care. However, the digital transformation can be problematic. Binders are still maintained due to the fact that a great deal of information still arrives in the office in paper form, either delivered by the internal postal service or via the fax machine. Earlier documentation did not include a daily report of care activities. Rather, the content of the binders is seen to relate more to background information about the person, such as name, ID number, names of relatives, phone numbers and lock code, as well as the aid-decision, medicine list and lunch box information. Hence, the binders contain practical information. This serves the care assistants and gives relevant information to substitutes and people new to the job or district. Such binders are usually kept in a locked cupboard in the office. The responsibility for maintenance of these binders is shared within work groups and their members. The routines for maintaining these binders are observed to occur during the lunch break or in the afternoon before leaving for home, and the routines are observed as natural elements during a break.

**Use strategies in Time-and-motion studies**

The use of time is a central dimension in administrators’ rhetoric. The time spent on planning and the effective management of time are critical factors. It is anticipated that through new technology, a more efficient use of time will be gained. As a result, home care assistants in Alpha, Beta and Gamma now have to declare what they do and when they do it. The time spent carrying out a house call is supposed to be documented. Hence, these computing activities will not only contextualise the house calls, they also imply that the care assistants are appointed the role of being their own timekeeper. Mobile ICT was thus introduced as a timepiece. The rationale of these ‘time-and-motion studies’ was that care assistants were collectively supposed to generate timesheets, which would provide an account of how their time is used in the field. As they worked their way down their work schedules, care assistants were expected to generate sequential time stamps. These time sequences would later be compared and analysed.

This study observed and identified a number of inherent constraints that have a direct effect on the care assistants’ individual and collective strategies for dealing with time and temporal dimensions of the workplace. They are part of the fluid tension which is caused by the recurrent shifts that care assistants have to make between base and case activities. Firstly, the case activity itself poses constraints. House calls have to be managed at a specific time and at a specific place, which means that every house call is associated with a certain timeliness. Assisting an elderly person out of bed and serving breakfast are two examples that are timely, as they take place in the morning and not, for example, at noon. Another view is that the elderly person’s daily rou-
tines and activities also hold a similar character of timeliness: if the person is away from home, it is naturally difficult to make a visit. Related to this is the fact that each task also answers to a timescale, which determines the duration of a house call. A particular house call has a specified time slot, i.e., a quarter of an hour, 30 minutes, one hour. The care assistants associate timeliness with particular tasks and the availability of people according to those constraints makes planning a complex exercise. Moreover, adding to the complexity, a shared quality among the care assistants is that they take pride in making sure that the tasks and activities they assist in are timely and that the use of the time slot is in accordance with the needs of the elderly person under care. This is the use context in which the time-and-motion studies were performed. The care assistants are observed to deal with these constraints through different use strategies, which are further explored below.

**Difficulties involved in using mobile ICT as a timepiece in practice**

The first situation involves a workgroup in Beta. Here, the design of the technology and the usual way of working both seem to affect the use situation. Another factor is the task of having to keep note of time, something which appears not to be a natural part of their work. The design of the timepiece was observed to be rather complicated. The following extract is taken from a discussion with two care assistants. The situation they describe shows that they choose to measure time in a way that gives an arbitrary result when answering the question on how they used their PDAs as a timepiece.

**F:** How do you use your PDAs during the fieldwork?

**S:** Many times we...

**F:** How does it work during a visit?

**S:** But no, but if put it like this, this PDA is not synchronised today, but the first thing I do is that I open it up like this, with my name of course, as you see here, and if it had been synchronised I had the list of all the task and visits that is assigned to me. Here is the client code, if I would like to know more about the client I just press here you see and then I also find a full specification of all things that we have to do during this visit. In this case I will do the dishes, make the bed, and prepare breakfast and start the clock and so on..

**F:** Is that something that you use for every visit?

**S:** No it is not.

**S2:** But we used the big computer for that

**S:** Mmm
S2: The time we so far spent there, the duration of the visit that is...

F: But if you do not use the time device at the client, how do you know how much time you have spent during the visit?

S2: It will be an approximate time measure

F: Approximately?

S2: Yes

S: You see, every visit is carefully planned and the time use is estimated...

S2: Here it is half an hour according to plan.

S: If the visit is planned to take place between, if it is planned to do the task between 8.00 and 8.20, and it instead takes ten minutes longer, I correct the visit in the big computer to 8.30. I could of course measure the time with the PDA, but then you have to remember to stop the clock manually.

S2: And that is what we usually do, forget that is, it is easy to forget.

S: Yes...

F: Why is it so easy to forget?

S2: In part because you usually are in a hurry to get to the next visit, and when standing outside the next client door, it is too late to stop it.

This imprecise answer might imply that the time keeping activity is not as prioritised as the administrators would like it to be. But what the care assistants do here is describe the actual use sequence and show me how the device is operated at the same time. In this situation, we go step by step through the ‘tapping sequence’ (S2 taps with the stylus on the screen of the PDA). Surprisingly, a considerable number of tapping steps are needed before the time keeping feature is reached. The tapping experienced in the sequence was seen as annoying. It was subject to criticism and was seen as a reason for carrying out the task somewhere else. As the conversation reveals, she chose instead to use the desktop computer for the task, which as a result increases the risk that the database will store inconsistent and inaccurate information. The information reflects the planned time, rather than the actual time spent on the visit. The use strategy identified here is clearly connected to the design and structure of the features of the mobile application, which hamper the care assistants’ attempts to use it as it was actually anticipated to be used.

Another problem that could result from the above use strategy relates to difficulties involving the use of mobile ICT in practical work routines. An explanation can be found in the field notes below.
“...The “start and stop situation” should take place outside the front door of the elderly person. Time is said to be measured in a way that the care receiver not will notice. First of all, there is no obvious reason for them to be distracted by the fact that such a control is being performed. Secondly, the PDA is not involved in the activity that starts the second the care assistant enters the hall. But what is start and stop situation all about then? Two problems are identified. The first concerns to find and navigate to the time measure button in the PDA interface is a cumbersome procedure. The user procedure is roughly described as: picks up the device, activates the device, logs in to the device, finds the appropriate schedule, locates the house call, finds the chronograph icon, taps icon and taps to choose start. Thus, a number of steps are needed. This sequence of steps is considered a problem, and more complaints are addressed as time passes. It takes too much time to handle the device in the particular situation. I do not see that these 5-7 steps soon will become internalised operations, the repetition of the procedure becomes a problem, which leads to that the care assistants does not use it at all. The care assistants seems instead it to be more urgent prioritizing the elderly and to get a good start of the visit...

Here, two questions had to be clarified. Firstly, what goes through the care assistant’s mind just before she rings the bell or unlocks the door to the client’s home? Is a visit organised beforehand and does it follow a strategy? If so, where does such a strategy take form? After a while, it became evident that most care assistants had a quite clear plan for every visit. The time just before the visit was either focused on mentally picking up this plan, or in the case of a visit that was new, the PDA was consulted for background information. Keeping time does not exist in the former example. In the latter, it is not involved other than as described above. The PDA as a timepiece seems to be easily forgotten at the point of care, and it seems easier said than done to involve it in the work routine. My observations show that information about what to do, i.e., make the bed, make breakfast, has higher priority among the care assistants than the timepiece. It is this practical information which directs the activities during a house call. If we go back to the time before the introduction of mobile ICT, the care assistants had to memorise the required tasks for each house call. Such information used to be scribbled on a piece of paper or in a notebook. Over time, and even if the notebook was taken to each activity, the details and the tasks connected to particular house calls were memorised and internalised by routine. The forthcoming visit and the situation waiting for them on the other side of the elderly person’s door do not make the last few meters approaching the elderly person’s front door an ideal situation in which to use the PDA. An experienced assistant usually uses this time to go through the task and the strategy that will, hopefully, be worked through during the visit.
Figure 6.1. A care assistant uses a notepad instead of her mobile device, here both as a her work schedule and for documentation in the field. Later on, when she gets back to the meeting locale she documents her round on the computer.

“... I asked A about how she chose to use the PDA regarding the signing of accomplished tasks. She said that it depended on the situation and she felt that the she was not really accustomed to use it as a part of a routine after every house call. She usually collected a pile of assignments and added that it was better to sign off all the assignments at the same time than to forget one or two...” (Field notes 200211).

There is no clear and obvious incentive to involve the technology in this routine, unless one is unsure of what to do and thereby use the mobile device to retrieve the information that is needed at that time. To memorise such
things7 is a true salient aspect of the home care practice developed over the years. Being used to doing without advanced ‘memory aids’, such as the PDA, could be a probable cause of difficulties in instantly involving this feature. Time keeping activities are often forgotten in the heat of the moment.

A similar situation seems to yield an explanation as to why these new technologies were seldom used to support administrative tasks in the field. Instead, it was observed that in the majority of groups the use of a PDA for administrative tasks occurred in the office. My observations show that the PDA is sometimes used in the car before and after a visit, but not as often as it is observed to take place in the office.

“... All the care assistants have their own routines in how and when they choose to sign off their assignments. Some of them do this directly after they have sat down in the office, others choose to do it while sitting in the cars. The result is that completion time for each assignment never correlates with the actual time of completion...” (Field notes 200311).

My observations revealed that it was quite common to register an entire day’s tasks in one go.

“... I asked A about how she chose to use the PDA regarding signing off accomplished tasks. She said that it depended on the situation and she felt that she was not really accustomed to use it as a part of a routine after every house call. She usually collected a pile of assignments and added that it was better to sign off all the assignments at the same time than to forget one or two...” Field notes, 200211).

On some occasions, registration took place even before the tasks were attended to.

“...The discussion around the lunch table in the meeting room today mostly concerned the use of the handheld computer. She said she used the PDA to sign off assignments she had accomplished. But she often chose to sign off certain assignments before they were carried out...” (Field notes 200211).

This strategy could be quite problematic, especially as the workplace undergoes rapid shifts and changes regularly.

“...In this situation S was reminded of the fact that she had forgotten to sign off the assignments on the PDA. When unpredictable things unfold in a certain way, it seems hard for the care assistants to follow a strictly given assignment list, whether its is

7 It is also related to a situation where the care assistants in Alpha and Beta use codes to refer to their clients: each code corresponds to a name, as well as a sequence of tasks and activities, and the details associated with them.
written down on a paper calendar or displayed on the screen of the PDA...” (Field notes 200311).

Figure 6.2. A care assistant uses her mobile device both as a her work schedule and for documentation in the field, usually in the car before or after a house call.

This is an example of a situation that is common but part of a complex structure of contingencies. It is a situation where the care assistants are faced with an emergency and even have to suddenly leave the current house call to attend to a colleague or other elderly person in trouble. In Alpha, the responsibility for the emergency phone is one such example where this situation occurs. Another and related factor is a slowly established practice of using
mobile phones to re-coordinate the work schedule. The outcome of such a situation is usually that the work schedule is altered and needs to be renegotiated with the rest of the group. But if the house calls are reported in advance, the person registered in the database will not have attended them at all.

**Automating documentation routines**

Administrators in Gamma decided to test two pilot projects that concerned mobile ICT. One of these pilots concerned a small technical device, known as TES. This device is similar in looks to a simple remote control and makes it possible to register tasks and keep time. The personal alarm that each elderly person has installed in their home is here used as a conveyer of data which is directly connected to the workflow system in the office. The remote control was used accordingly. When the care assistant enters the home of the elderly person, she or he pushes a button which then activates the house call. The care assistant does what is expected and, before she leaves, the tasks are reported. It is possible to report in two ways. If the visit complies with normal routine, the care assistant uses a general code. If for any reason a task is left undone, she has to report each task with its corresponding code, one by one. When the TES device is used, the information in the workflow application is updated in an instant and the care assistant can focus on the visit.

There were, however, a couple of problems connected to the use of this technical solution. The control aspect of the solution is characterised by a very concrete surveillance of work: this was strongly criticised by the teams that took part in the pilot. The feedback or lack of feedback offered by the remote was not seen as satisfactory. When the button was pushed, the personal alarm confirmed the interaction by giving a ‘blip-blip’ sound. It was also how the care assistants chose to describe their use of the device:

‘...we ‘blip-blip’ before we start and again before we leave...’

According to the care assistants, the sound became strongly associated by some elderly care receivers with the visit’s start and end. It thus involved yet one more person in the interaction with the system. The final ‘blip-blip’ was often followed by complaints by the elderly care receiver that the valuable ‘comfort’ time offered by the visit was about to end. This was an effect that I cannot recall observing in situations where the PDA or the mobile phone were used.

It was not however the only problem with this technical arrangement. Communication between the personal alarm box and the workflow system was dependent on having the correct settings for the system variables with regard to each house call and each care assistant. This was a problem, as
those visits where such conflicts occurred were not registered. One explanation could be that the team lacked experience of correctly configuring the system in order to avoid such a conflict. However, my observation was that the configuration, or list of tasks itself, was too strict and reflected a too rigid and instrumental view of the practice both in terms of the visit and the volatile nature of the workplace. The care assistants were forced to correct the information when they returned to the office. While doing this, they had to recall the tasks that they had accomplished and the time that they had started and finished these tasks. The support offered by this solution was rejected for a number of reasons: namely, a combination of lack of interaction feedback, the re-occurring variable conflicts in the system and the strong control aspect. The information generated by this automatic-oriented administration is also arbitrary when we know how it works in practice.

**Documenting strategies - being accountable**

In general, my observations show that care assistants put a lot more effort into their work than the aid decision gives credit for. Most of these efforts are never documented. If we turn to a particular situation that illustrates these extra efforts, it is possible to show how actual practice maps the ideas which underpin the rationale of the new technology. It is important to note that these extra efforts are conscious choices that are directly related to a client’s view of what constitutes added quality to the services they pay for. We will follow Maja, who is about to visit an elderly man who receives help with breakfast.

“... Maja says that the difference between the ‘old’ and the ‘new’, the ‘experienced’ and the ‘novices’ is how the visits are managed. The youngsters follow the description more than we do, she said. If you are experienced you have the feeling and the ability to help the client a bit more, which adds a little extra. We are approaching the next visit, and I will soon learn what adding a bit extra actually implies. It is the second visit this morning and we are about to visit an elderly man that will be served breakfast. His bed will also be made according to the description of the visit. While walking from the car, Maja picks up her PDA and sets the timepiece in motion. It takes a couple of minutes to get to the front door where Maja rings the doorbell and sticks the key in the lock. Owe, the client, is already awake and greets us as we enter the hallway. Maja starts to ask Owe questions about how his night and morning have unfolded. At the same time she heads for the kitchen to make coffee and prepare the breakfast.

That little extra that Maja mentioned in the car is now shown. She waits for Owe to eat his breakfast while she goes on talking and at the same time she wipes off his counter; moreover she also spends 20 minutes of the visit cleaning his larder. This is to my understanding the little extra and before I manage to ask her about why
she does these things, she gives me the answer that she finds motivation in giving the elderly something in addition to what is given in the visit description. When Owe has finished his coffee, she takes his cup, does the washing up and takes the garbage bag and puts it by the front door. We take the garbage with us as we walk towards the car again, and Maja disposes the bag in the shared huge garbage bin that is standing in the parking space. It is at this moment that she picks up her PDA again. She stops the timekeeper and taps the visit completed, and adds that - if we are supposed to measure and declare the visits, timewise, this is the point were the visit ends, not by the front door…”

Through her use of the timepiece, Maja’s intention is to provide the administrators with information about how much time the house call really took. This is in perfect order, since it is the kind of contextualisation that is wanted. However, Maja withholds the fact that she cleaned out the cupboards. It is not a service that we find in the aid decision and in the work description given on the mobile device. It is a piece of information that, if Maja had included it, would certainly have led to criticism of her action. A similar situation is found in Alpha, where a care assistant helped a client to sweep her pellet burner. This is a clear example of an activity that is not included in the official ‘to-do’ list. The additional assistance and help given by the care assistants is a problematic issue. What would happen if the pellet burner was broken during sweeping or, even worse, if the house caught fire because the sweeping had not been done correctly? Who would be responsible for the cost and loss caused by such situations? The focus on real work situations not only provides an indication that the new technology is more complicated than anticipated, but also reveals that home care often offers more than is expected by the clients. Such assistance is unaccounted for and seldom registered.

Individual accountability is also a grey area in which information is arbitrary. In home care, especially in districts where cars have to be used for transport, the care assistants work in pairs. My observations show that they work as a team, attending some visits together and attending some on their own. Here, we can look at a situation in Alpha where two care assistants have just left the office and are approaching their first visits.

“…It is clear that this is not the first time they have worked together. It is noticeable by observing their entrance and the first minutes of the visit. Both know what to do and they work more or less as one person. The task is to see that a person is assisted with her morning toilet, given breakfast and that the bed is made. The work is smoothly handled, and there is also some social time before they have to leave for the next house call. The morning unfolds and the work follows a sequence of visits where some of these visits are managed together and others individually…”
The pairwise work arrangement is an established way of working in Alpha. Some visits require two people and the planning system is configured to manage these tasks accordingly. But in the example above, the individual tasks are managed in the same way. Even if they attend some visits alone and some in pairs, the work they register is not in accordance with the work performed.

The new technology favours an individual perspective on work and, in the eyes of these support systems, home care work is a solitary activity. Even if many administrators agree on the fact that the work depends on collaboration, they are now aware that the collaborative dimension is not considered at all in the prescribed use of these tools. What is clear is that the introduction of new technology make the care assistants more directly and visibly accountable for their actions. The backlog of work is now much more detailed than it was before. Individual accountability is an ever-relevant topic in home care. It is reflected in the care assistants’ use of personal planners where they, by default, choose to write down whom they visited and sometimes even what they did during the visit. These records are kept alongside the digital files in the office. They note down what they do in their personal planners just in case the administrators ask about their whereabouts during a particular day or a particular visit. This situation reflects a tradition where the personal diary was the only individual evidence to hand, since no public or shared record existed for such a purpose. The care assistants in Alpha showed evidence of having a lack of trust of the technology from the beginning. This distrust was reflected in their suspicions about their work being observed by administrators, as they admitted that they did lack clear motivation and declaration about the ‘real’ purpose of registering and keeping time of their work.

Why is individual accountability important? In this context, it concerns who did what and when. ‘Who’ and ‘when’ are fairly well covered. The ‘what’ referred to here is the piece of information about the house call and this varies in detail. From an administrator’s point of view, this is the information that is most relevant. For the care assistant, however, it becomes a concern in situations where, for example, somebody has been accused of stealing, or of failing to attend a particular house call. Although the accusation is often proved to be false, it is a matter of utmost importance to be able to show all the ‘cards’ in the deck. Home care assists people that are vulnerable and dependent on the help they receive. A situation in which trust has broken down is devastating and takes time to restore. The use of these new technologies will lead to a contextualisation of the visits. The ‘time-and-motion studies’ will thus potentially strengthen individual accountability, but concern only the information noted in the aid decision by the assistance officer, nothing more and nothing less.
Mobile ICT as an administrative tool is problematic

Problems arise in the different ways that the care assistants choose to involve mobile devices. The data that is generated does not reflect accomplished work, hence the current use of mobile devices produces untrustworthy data. The care assistants’ view on time keeping and the use behaviours that are observed result in the obtained data that is stored in the system database being arbitrary. This data often follows the planned and pre-estimated timescales for each task and not the actual time spent working on these tasks. The immediate consequence is that the generated data does not reflect the reality and any real accomplishment of work. The only aspect that is known is whether a particular task has been accomplished, not when and in some cases not even by whom. The observations take account of the fact that it generally seems difficult to routinely involve the use of mobile devices in the daily round of work. This is independent of whether there is a clear objective, which either demands or promotes the use or non-use of mobile ICT. This is a general observation that adheres to all cases involved in the study. It focuses on the importance of reaching an agreement on ordering information into pre-set categories, as well as on the way that deviations from such categories affect the shared account in the contextualisation activities of each house call.

The majority of non-use situations indicate that the care assistants’ use of mobile devices in administrative tasks is dependent on having an appropriate place where the tasks can be managed. It is a concern when the intended rationale of use has no bearing on the influences generated by the everyday use and non-use of the mobile devices. Mobile devices are not often used in documentation work during case activities and the general observation is that documentation of care work is an observed base activity performed in the office using a desktop computer during breaks and on other occasions. The introduction of mobile devices in home care, as discussed above, has a control rationale which materialises in time keeping and task registration activities. Regardless of the concerns raised in this study, the mobile device seems unfit for such a purpose. In general, the mobile devices used as an administrative tool show a similar weakness in meeting the objectives they are intended to support.

There seems to be a noteworthy relationship between time keeping activities and the structure of the billing system. In Alpha, the issue of time is not central, since the people under care are not billed according to time, but according to the performance of assisted tasks. Each task does of course relate to a timescale, but the person under care is unaware of this. As a result, a visit that may one day take 20 minutes, might very well take an hour the next day. In Beta and Gamma, however, the billing systems concern time directly.
The elderly people under care are billed according to the time taken by care assistants in view of the aid decisions recorded. House calls that according to the aid decision are estimated to take one hour effectively mean that the care assistants stay for one hour. The timepiece will thus confirm that the care assistants use the correct amount of time.

The different types of billing systems provide different arguments on motivation for the use of mobile devices. The billing systems also affect how work in practice is organised, as a focus on either time or task provides different constraints on flexibility of work organisation. The observation that the billing systems in Beta and Gamma are based on time rather than on tasks provides the administrators with a stronger argument and motivation for promoting time keeping activities. In Alpha, where the billing system is based on performed tasks rather than time keeping activities, a direct focus is put on care assistant performance, rather than duration of a house call. This is due to the fact that the timescale for each task is missing. It is essential to gain an understanding on these perspectives in order to go on to explore two explicit views and imperatives of uses of mobile devices as control devices based on these underlying rationales. The first imperative concerns keeping time and the registration of accomplished tasks. The other concerns the registration of accomplished tasks only. Care assistants in Alpha work according to the latter imperative, whilst the care assistants in Beta and Gamma are set to work in accordance with the former.

Mobile ICT as a component in a shared information space

Home care work is an ongoing activity in which the care assistants seek to balance and sustain a manageable orderliness in the workplace. Different sources of information are identified as playing important roles in this activity. The discussion asserts that home care is dependent on smooth teamwork and negotiations of how to “collectively” approach house calls. At the same time, house calls are mostly dealt with alone and organised individually, but within limits collectively agreed by the group. In cooperative work, the social organisations of cooperative practice are embodied in artefacts (Perry, 1997). One typical example of such an embodiment are tools that are used as common information spaces (Bannon and Bødker, 1997). Simple examples of such information spaces are paper charts and diaries which are shared and maintained in cooperative practice. More novel examples can be found in groupware applications, which also offer the user shared workspaces and tools for collaboration.

Mobile ICT as an administrative tool is used to contextualise each house call and client history. This information is shared by the fact that it is dis-
distributed over a multitude of displays. Process-centralising information does away with traditional information repositories; it also removes the need for a fragmented and redundant information landscape. The ‘patchiness’ is a natural consequence of having too many people maintain multiple repositories alongside each other. People tend to keep different facets of information up to date, but with a similar aim in mind. The result is often that the information becomes redundant and fragmented. This transformation process is currently in progress in Alpha, Beta and Gamma. It takes time and new resources are added continuously. It is thus not only ‘the office’ activities that are distributed, but also work schedules and information that are now distributed through mobile ICT. These were formerly kept in an array of different places, i.e., binders, diaries, filing cabinet checklists, shared messages and ‘rules of thumb’ attached on notice boards. It is worth noting that the introduction of computer technology initiates a transformation process towards a shared information space. The use of mobile ICT involves shared information which is distributed on multiple displays. These shared displays are shown to serve different roles in home care practice.

**Mobile ICT provides a sense of confidence**

Shared display provides a sense of confidence. Home care work is mostly managed in the homes of the elderly and every location has its specific features. The care assistants need to adjust and acclimatise to new physical conditions for each and every visit. They have to adjust to someone else’s home organisation, including the use of household commodities, such as plates and cups, towels, furniture and vacuum cleaners. These all have to be treated according to the restrictions that the elderly person imposes on their own environment. This order must be considered when formulating the strategy for a visit. The work is guided by a list of tasks that the elderly person will get help with. However, the care assistants still have to use their own knowledge about a particular home in order to carry out this list of tasks as smoothly as possible. This information has never been recorded in any binders or papers. It has been passed between care assistants through discussions and stories that are shared during breaks. Before mobile ICT devices were introduced in Alpha, the care assistants kept their work schedules scribbled down on a piece of paper or in their daily planner. The work schedule did not only provide the order of visits, it was also a work description. Care assistants associated the client code or the name not only with specific tasks in a work schedule, but also with the home as a whole. The home is not only the home of the elderly person, it is the space that guides the actions that the care assistants have at their disposal in their work with the client.

When the work schedule is distributed on a PDA, additional features come into play. Background information about each house call also includes a
work description, a visit plan and an informal ‘to-do’ list, which holds a detailed and contextualised description of each visit. In other words, this is the information that formerly took both time and effort to learn. This guiding information is useful for those having more experience, as well as newcomers and substitutes, perhaps mostly for the latter group.

The care assistants are attentive to the current needs expressed by the particular elderly person as well as past needs. They include their opinions as a natural component when they talk about visits and their outcome. Hence, the daily work round produces crucial attributes that are incrementally added and interwoven into the texture of each visit history. In the quote given below, the care assistant mentions that the mistakes made during visits are reduced. I would argue that uncertainty experienced while working in the home of the clients is also reduced if time is given to discuss and share these attributes, allowing them to be added to the visit history.

The work description should not be mistaken for being simply a list of tasks included in an aid-decision, i.e., breakfast, toilet, make bed. The work description is a shared tool that facilitates the care assistants’ work, contextualising the different tasks more effectively. The work description describes the tasks and also includes details that are negotiated collectively, taking into account how the elderly person would like the tasks to be performed. These negotiations or agreements are managed through the coordination of work that takes place during morning meetings. It thus also describes how the care assistants can collectively ensure adherence to good routines for the elderly person, and moreover that they collectively stick to a shared routine of conduct and act as one person. The work description describes the basics and regulates the time and expected duration of a visit.

“... I think it is that we have all the information about whom is working and so on...and by bringing the information we also reduce the usual mistakes we do, and it reduces the time when we have an emergency situation to deal with, and let us say that you recently started to work here, or even if you have worked for a longer time. If we recently got a new client we will have enough information to just go there and start to do the things you are set to do...” (Group interview, November 2002, Alpha)

In Alpha, the introduction of mobile ICT has saved time. The response time to emergency situations is shortened. Formerly, if an emergency occurred, the care assistants had to go back to the office and get all the necessary information they needed about the elderly person who had activated the alarm. The simple concept of having updated information on a PDA was articulated as a sense of self-assurance in not being forced to memorise all the relevant information that is needed in such situations. The use of mobile ICT provides a sense of confidence and assurance. It is connected to the accessi-
bility of information and people during emergency situations and when de-
tails need to be accessed in the work description for each house call. It does
so even when the devices are stowed in jacket pockets and bags.

**Shared information - a key for effective collaboration**

The care assistants criticised an interface design which they found to be
too individual-oriented: the PDA application did not provide a shared view of
their work schedules. With access to each other’s work schedules, they would
have greater foresight into what is due to happen in the workplace over the
next few days. The only foresight that was offered at the time was informa-
tion about which of the team members would next visit a particular client.

The design solution is different in Alpha and Beta in that the care assis-
tants have access to everybody’s work schedules. The shared information
view offered here makes locating colleagues a little easier. However, my ob-
servations show that this is not the device’s intended use in practice; it is eas-
ier to pick up the mobile phone and give the colleague a call when they need
to know their location. Having access to one’s work schedules is still an im-
portant component. It plays a crucial role in the continuous information-
browsing carried out by care assistants on a daily basis. The work schedule
gives an awareness of their colleagues’ whereabouts, as one care assistant
chose to point out,

“I can if I want to, check where some of my colleagues might be...-
If I would like to know where they are, I tap here (shows how its
done on the PDA)...” Interview; Oktober 2001

This relates not only to the positioning of colleagues, but also to informa-
tion that offers cues for questions and discussions connected to particular
visits or other practical matters.

Distributed information complements the mobile phones that are also
used to contact the care assistants. Shared information can be used in differ-
ent ways. The care assistants use the distributed work schedules to locate
each other when they need to make contact. This is said to be a motivating
factor and feature offered by the PDAs. Access to each other’s work schedules
would make it easier to locate colleagues during the daily work round. In Al-
pha, shared work schedules are an explicit benefit associated with the role of
PDAs. When you look at your colleagues’ work schedules you are aware of
what they do and can share each other’s work at a distance. A similar posi-
tion exists in Beta, in addition to work schedules distributed on paper. The
care assistants explain the need to locate each other in situations when a
valid work plan needs to be re-negotiated due to sudden shifts and changes.
The work schedule provides the necessary ongoing information to meet this
need.
The opportunity to locate and position peers can be useful for many different reasons. However, it is doubtful as to whether the work schedule is used in the way they state. Other explanations seem to be more valid: for example, if one needs to quickly get hold of someone, the mobile phone is more likely to be used instead. Looking at the situation in Gamma, information about the colleagues’ work schedules was not available on the mobile application. The fact that a lack of information is noted is interesting in that it highlights that there is a need for the information. When asked about improvements to the system, the care assistants stated that they really wanted this information to be added. Their argument was that they wanted to know what their colleagues were doing. To be unaware of what their colleagues did was frustrating and was said to emphasise the solitary character of their work. One reasonable explanation, besides just knowing, was that if a situation did occur where help was needed, the person that was closest could be contacted. It is an indicator that constraints imposed by the spatial configuration of the work context are factors which can be remedied by mobile ICT.

Another noted effect was that the information and interactions offered by mobile phones meant that their work became less solitary and more social and collaborative. This does not mean that the work was missing a collaborative dimension before, but rather that it was emphasised through the support offered by mobile ICT. The different groups in Gamma discuss house calls and routines during meetings and breaks in a similar fashion to Alpha, and the care assistants are sometimes dependent on the suggestions and shared agreements of how to handle a particular visit. The articulated need to be aware of colleagues and their whereabouts not only addresses the collaborative nature of home care, but also the fluidity of home care due to the dynamic work environment. The care assistants need to be attentive to work conditions that rapidly change. During this study, mobile phones have become established salient features of home care practice, not only in that current PDA technology offers a good phone function, but also because IT is already part and parcel of the work environment.
Figure 6.4. The mobile phone is used in the field for confirming, coordinating activities. During travel it was observed that the mobile devices offered direct support as a road map. The person sitting in the front passenger seat was the one taking the lead in those situations.

**Use of the interactive capacity in mobile ICT**

Home care is a collaborative work activity that depends on effective communication and coordination. The day shift is more dependent on the coordination and re-coordination of visits and their tasks, since keeping up a reasonable level of orderliness is a crucial part of home care fieldwork. It concerns the efficient articulation and coordination of tasks, transport and time. The only factor among the three that constantly increases is the number of tasks. Transport and time are the critical and scarce resources. The planned sequence of actions after the morning meetings is often not valid for more than an hour. This is due usually to difficulties in estimating the time needed for house calls and any unexpected events.

My observations show that communication and coordination can easily be managed with the use of mobile phones. If shared information is provided on a PDA, mobile phones can mediate the interaction which maintains that space. In Alpha, mobile phones have long provided a crucial link in the personal alarm system. However, the ways in which the alarm system is used to support interaction and communication within the group tells us that the use of mobile phones is nothing new. It is an infrastructure that serves as an effective support for home care care assistants all over the country. By looking at the interaction and traffic on those mobile phones provided by the municipality, it is possible to immediately see evidence of their involvement in a
fairly constant level of interaction over time. The figures below only reveal the outgoing number of calls registered on the phone bills. If we were to seek an accurate amount of interaction using those private mobile phones, all parts of interaction should be added to the equation.

**Figure 6.5.** The diagram shows the number of phone calls made between internal phones (Yellow); calls to external phones using the same operator as the municipality have (Green); and calls to external phones associated with other operators (Blue). The diagram also shows that use of text messages is very low.

In Alpha, the administrators have complained about the teams’ ‘misuse’ of the mobile phones, both in terms of the use of the alarm system and the bills which were seen to be wide of the mark. From observations of the activities where these mobile devices are involved, however, this makes perfect sense. Mobile phones support the group and the collective shared accomplishment of the total work schedule.

“…Their own mobiles are used frequently while working and I asked why this was so. - We became aware that it was so easy to get hold of each other. But you are not obliged to give your number to everyone, I do not have all my colleagues on my phonebook…” (Field notes, November 2002)

Mobile phones are a normal part of the management of interactions in the workplace and play a crucial role in the shared work involved in making each other aware of ongoing changes and activities. My observations clearly show
that the use of mobile phones serves a clear purpose: to make each other aware of changes to the plan. To sum up, the coordination which uses the alarm phone reveals that the mobile phones are used to give notification, ask questions and give confirmation. The example signifies that it is clearly not private social conversation and does not qualify, then, as misuse of shared resources. Mobile phones are perhaps the simplest mobile ICT support that home care organisations can currently invest in.

Figure 6.6. The diagram shows the total number of calls made within the different workgroups in Alpha during the years 2004, 2005 and 2006.

Similar use patterns are observed in Gamma, where the mobile phone is observed to be an essential tool of practice. The teams involved in the study all had access to two dedicated mobile phones. Some groups actually had more phones than other groups, despite the fact that the group had as many members. I learned that this situation was a result of some groups having been much more persistent in their requests to get more mobile phones than others. I also observed that the substitutes and part-time care assistants were much more keen to gain access to these phones. The use of mobile phones in Gamma follows a similar pattern to that found in other groups during the study. It is important to add that use is observed to increase as the study progressed. This is a factor that seems to have an effect on both the intensity of how the mobile phones are used and the direction of their use in the work model. It is important to note that whilst facilitating collaboration and the sharing of work, the mobile phones are more frequently used for coordination than for individual work.
Figure 6.7. The diagram shows the total costs and number of subscriptions from 2002 to the beginning of 2007. Quarter 3 2005 is missing in the data.

Figure 6.8. The diagram shows the increase of costs associated with mobile phone calls at the time for the pilot project which introduced Pock- etVO in Gamma. This is in the diagram marked in red.
In Gamma, most visits are handled by one care assistant. In Alpha, some visits require two people, particularly when heavy lifting and cleaning are on the visit description. This factor causes a degree of coordination in Alpha that is missing in Gamma. The work in Gamma is thus more individual, which is also reflected in the use of the mobile device. Here, the use of mobile phones is clearly connected to interruptions in work; for example, when a client is found not to be at home, or if the client is not feeling well. One such situation is when a care assistant arrives at the door of a person under care and, while there, realises that the person is not at home.

According to the information in the work schedule, the person under care is supposed to be at home and expects a visit. The care assistant contemplates the situation, asking herself whether, even if the client has been away for a while due to cancer treatment at the hospital, he should be back by today? She does not have a key to the apartment and cannot therefore check if the client is having trouble getting to the door. She tries to call the client using her mobile phone, but nobody answers the phone on the other side of the door. This is the usual way that care assistants try to get attention if the doorbell is not heard because the TV or radio is too loud. The care assistant makes a quick call to the administrator about the client, both to get instructions on how to manage the situation and to get more information that would give some clue as to what to do next. They agree that it is best that the assistant leaves and moves onto the next client. The administrator promises to get more information about what has happened to the client. What is interesting here is that the mobile phone offers a number of options for interaction, not only with peers but also with the clients. Whilst the latter was less successful in this example, it is nevertheless an option. Using the mobile phone as a ‘door key’ is a part of current practice. The interaction between the assistant and the administrator shows a shared agreement of what to do when interruptions occur. In this situation, the administrator was called as she had access to the computer files.

Discussion

Many of the early initiatives that tested mobile ICT as an information carrier in home care work have failed. It is not clear that mobile ICT are a support for home care practice, as these technologies are found to be quite expensive to run and replace. In addition, they do not seem to generate enough evidence of being important in everyday work, at least from the administration’s point of view. Here, three significant issues become evident. Firstly, the use of mobile ICT as a documenting tool does not seem to have a natural place in fieldwork activities. There is a mismatch between care assistants’ ways of dealing with their work in the field and the idea of how mobile ICT was supposed to be involved. When the design of the documenting features
are considered, more factors need to be considered; these need to take into account where the documentation take place. Even if the idea of a distributed office might need to be revised, the changed administrative routines are cornerstones in the transformation of home care. Through mobile ICT, care assistants can help each other contextualise their house calls more efficiently than they could before. Also of direct relevance here is the kind of billing scheme that is used. If based on task or time, it affect how the timekeepers are used, and consequently how the visits are contextualised in the system. However, to be appointed one’s own timekeeper does not seem to be the way forward. Suspicion is, of course, understandable: the anticipated result of using the mobile ICT as a control tool is currently failing because it does not offer a meaningful usage. As a result, what the care assistants do with their time is arbitrarily measured and documented information is not trustworthy enough if the data is supposed to be used for evaluation and measurement.

Secondly, the previous chapter gave evidence of a culture of giving, where the care assistants shared information during meeting discussions and in their use of the diary. The use of mobile ICT as shared displays aligns well with this culture, when information is distributed to the point of care. The care assistants are given true support in critical situations. Access to information through mobile ICT makes people feel safer in their day-to-day work. It also plays an important role in the activities that maintain orderliness in the workplace, by allowing the care assistants to maintain the routines required by every house call. Irrespective of whether someone is new to the job or new to the district, the care assistant will have a clear view of what to do without risking doing too much or too little. The use of mobile ICT is a natural part of home care fieldwork. It helps the care assistants to manage interruptions in the workplace and deal with activities that are volatile and fluid.

Thirdly, communication, which is mediated by mobile ICT does find a natural place in fieldwork activities. Looking at the support that mobile ICT offers practical work, for information support and communication support between peers, its use is a success. Mobile ICT provides the care assistants with new interactive capabilities that support the practical accomplishment of their work. This study shows that the use of mobile phones and the different ways they are involved in practice, transcends formal responsibilities and traditional boundaries within the organisation. Mobile ICT is a central component in ongoing coordination work to maintain an orderly workplace. It is used to provide just-in-time information about changes in the previously negotiated work plan. Mobile ICT is a time-efficient alternative for solving practical problems in the workplace. To call a fellow care assistant for advice and to receive calls from fellow peers is said to make the work more social and shared. However, mobile ICT are not only involved in interaction with peers. They are also involved in situations where the elderly person they are
about to visit needs to be contacted. This could relate to a situation where a visit has to be postponed or delayed. It could even be to call the land line number of an elderly person who is not answering the doorbell; in other words, acting as a second, and perhaps even more effective, doorbell function. Mobile ICT thus supports the care assistants as they “open doors” in new ways, as shown by the examples of situations and interaction on which the involvement of mobile ICT in home care work hangs. The mobile phone is proven to be an interaction technology that is used whether it is promoted or not. It is already in place and has a clear role in the shared interaction space in home care practice. The transparent feature it offers can bridge boundaries in the workplace and beyond. Hence, the features of mobile ICT and the ways in which it is practically involved are largely dependent on the fact that it is an interactive device. It quickly becomes part of intense cooperative activities. Interestingly, at the same time as the is observed Mobile ICT, e.g. the mobile phone, to serve the collective practice well, it is a taken for granted resource (cf. Ling, 2008), which easily is forgotten when these support systems are discussed.

The distribution of information does change traditional work routines and provides opportunities to work more efficiently. It was, however, with the combination of a PDA and mobile phone that this efficiency was shown to excel. When mobile devices have phone features with communication access, they can provide information about whom to call and any crucial information about the elderly person of which the care assistant needs to be aware. Nowadays, these features can be found in one device, giving even more reasons to highlight the need to acknowledge the extent to which the interactive capacity of mobile ICT is used in practice.
Changing Practices

The talk about the elderly is essential to home care practice and I would assert that the care assistants practice share many similarities with Orrs’ (1996) presentation of the service reps work practice. In home care, meetings, stories about the elderly bring problems and difficult situations to the surface in ways that few written accounts would. They provide a support for solving problems and dilemmas and they seem to adjust actions so that they are in line with shared views in the group on how particular situations could be managed. One document in particular is central to facilitating such stories and discussions about the elderly in home care - the simple notebook. In this study, it is termed the group diary. Its existence was revealed through care assistants’ criticism of particular features of the new support system during the early stages of implementation. This group diary was discussed with such passion that it was felt necessary to follow it up and observe how it was used. The strategy utilised in my fieldwork already allows for the tracking of information (Harper, 1999). During my observations of care assistants at work, I learned that information regarding ongoing activities is shared through the group diary. Such an observation is bound to a particular group. However, almost every group featured in this study uses a group diary (in some groups, it is also called the report book). The group diary is a central resource and seems to play a crucial role in the maintenance of social ties and ongoing activities. The group diary plays a similar role as the SVOP binder explored by Petrakou (2007) does, but it do not govern a similar degree of formalisation as the SVOP binder. Whereas the SVOP binder is more of a boundary object between different communities. The group diary belong to the occupational
community and workgroup alone. The group diary, perhaps more than any other tool in this context, offers written evidence of what Orre and Watts (2006) term ‘a practical sense of knowing’. The use of the group diary relates to peripheral information and awareness cues that are part and parcel of ongoing discussions within home care work groups. Of greater interest, however, is the fact that, besides providing a unique and promising source for design information, it is also a unique account of how the use of ICT changes home care practice. As a recording device, the group diary revealed important fragments of work and daily achievements. It thus acted as a central component in the ongoing ‘plot’ (Marcus, 1996) of home care. A shared display for ongoing activities

The first meet with the Group Diary

The first time I come across the group diary was on the very first day of the fieldwork. Representatives from the software company responsible for Joliv mobile care had arranged a user meeting and users from Alpha and Beta, together with representatives from the municipality, and a couple of other people with an interest in the latest technologies gathered to discuss the results of a user questionnaire. It was however not the questionnaire that was of relevance here. One problem that the two home care groups seemed to agree upon independently of each other was how the messages and notification feature in the desktop application was managed and how it could be managed in the future. It was argued that this feature needed to be redesigned or modified. The meeting revealed that both groups had strong opinions on how this feature failed to support their work and how it worked counter to their intentions and strategies. The result was that the workers refused to use the feature because they lacked motivation and it was cumbersome to use. There are, of course, a number of tentative problem sources. Firstly, this criticism was raised at a very early stage of the implementation process. This was a time when the workers in Beta and Alpha were still negotiating the use of the system and, just as important, the role of the diary. Two probable explanations can be discussed here. Firstly, the people using the technology may not have yet managed to establish a common agreement on how to handle the information supported by the new devices. This is a reasonable point which I believe holds true to some extent. Secondly, it could also be the case that the IT support is poorly designed in that it lacks support for such information and activity. Both explanations offer relatively acceptable answers. However, from a long-term perspective, it is questionable whether the poor or superior design of the note-taking feature significantly influences the workers’ acceptance of the new technology. An immediate consequence of this situation is that when the feature was used, the piece of information ran a greater risk of being lost or forgotten. Firstly, the group
had not yet agreed on how to use the system and the software and how to separate static task information and activity information. This rendered it almost impossible to get a full picture of the situation without spending too much time in the office. The reply from the designers was that they considered the function manageable. They attempted to evade the issue, since from their point of view it was properly implemented. As Berg (1997) stated, “Advocates overlook how tools are always located; how a local context and reflections of past negotiations are built into the heart of the rational tool” (Berg, 1997, p. 169).

The group diary has been a central information resource in everyday home care practice for some time. During the fieldwork, the group diary or report book, was a repository that was used in all home care locales that were visited. It is a tool shared among the care assistants in the workgroup and holds a historical account of the ongoing activities of a home care workplace. Through the group diary, the workers find out useful information to guide them about clients. Often this information is the result of situations where a care assistant has had a hunch that extra attention is needed or there are things that just need to be considered during the next couple of visits. The group diary is a tool that is browsed through several times during a workday. Its role is central in making the group members aware of ongoing activities and situations. No one can be in two places at once: the group diary gives cues in order to learn about a situation after it has occurred. Case-specific information for individual care workers can be communicated through the group diary and, because of the mechanism of its circulation, it also contributes: (i) knowledge of ongoing case history (medium-to-long term), (ii) situational case knowledge (yesterday and today, short-term history) and (iii) colleagues’ responsibilities and goals for the day. In short, the use of a group diary fosters a generalised sense of awareness in the workplace, both in terms of collaborators’ activities and the objects of collaborative work. It is an artefact that scores high on all the criteria of a common information space. The group diary seems to hold keys to understanding crucial aspects of practice. It is a resource which accommodates and support the activities maintaining orderliness in the workplace and communicates cues that support the establishment of a mutual understanding of the condition and well-being of the elderly under care.
Figure 7.1. The group diary contains much need-to-know information for the time being. How this information is presented follows a number of salient rules. One example of such a rule is stated above, which on the front page declares that the upper section of the page records matters that need attention during the day shift for the workgroups 1, 2, and 3 in Alpha. The lower sections give corresponding information for the evening shift. This is also an example of a shift and transformation stage in how the group diary is used, which share strong similarities with how the workgroups involved ICT supported documentation in their practice.
The use and development of the group diary

In an earlier chapter, I went back in time to compare whether and how current and past procedures fit together. A similar approach will be attempted here to present the evolution and development of the group diary. With this in mind, a scheme of development has been used to illustrate the role of the diary during different phases in the transformation of the workplace. The scheme presents the unfolding development of the diary in Alpha, the site where developments have been followed from the start of this research (cf. Orre, 2002; 2004). Although my observations are limited to this site and workgroup, the role played by the group diary in coordination activities indicates that it plays a similar role in other workgroups.

The group diary contains “the minutes” of what are considered to be critical situations, which the workers directly or indirectly have under their surveillance. It also concerns quite practical problems that have little to do with care. For example, it could concern information about an appointment with the car workshop and other practicalities that have to be dealt with. Here, I will present my view of how the group diary is transformed. I will do so by dividing the transformation into a number of stages. These stages signify radical shifts in context where the diary is used and which also renew the role of the group diary.

A point of departure - Use within a group

Before the start of this study, the situation in Alpha was rather different to that found today. The home care office was a locale where three separate workgroups met every morning, as well as an evening shift. There was little ‘talk about work’ between these groupings. Each group was responsible for their own clients and, according to the interviews, the groups did not collaborate or help each other in any case other than a true emergency. This was especially so in situations where the workload fluctuated. If one of the groups experienced a temporarily heavy workload, the others did not pitch in and help out. Instead, they enjoyed the extra time and awaited their turn for an increased workload.

In this situation, the group diary was a means for communicating within the workgroup and not between workgroups. The diary used by the night shift was one exception. This diary was shared in the sense that each workgroup had access to it and saw to update it as necessary to be aware of information about the clients due to be visited during the evening. It was also in this diary that the care assistants could read about any developments relating to a client during the evening shift. The evening shift personnel did not, however, add to the three other diaries used by the different workgroups.
The three workgroups had co-existed for a long time. The only resource they shared was the locale. Whilst this might seem to be a rather odd situation, it does not mean that they did not communicate or have any kind of social interaction. Workwise, though, the accounts given in the interviews indicate a very protective relationship between these groups. They were not rivals, but they cared for and protected their clients. In Alpha, this meant that work was not shared between the groups. As already stated, the workload in home care can vary for many reasons; it comes and goes in cycles. If one of these groups had a lot to do, it was not common for the other groups to pitch in and help to make the load lighter.

**A first transformation stage - Use within and between groups**

It was at first only one of the three workgroups in Alpha that started to explore the computer application as they got involved in the design process of JOliV mobile care. They could provide their experience of home care and consequently also influence the design of the system before it was introduced to all the three workgroups. When the computer arrived on that scene in Alpha, something radical happened. Earlier chapters have revealed the auction-like routine traditionally used by the care assistants in Alpha. With the arrival of the computer, the small group’s routine was retained, but in a modified state. The coordination and production of work schedules now resulted in the three small groups being pushed together into a large workgroup. The result of this change was that the workgroups could no longer keep their coordination activities separate, nor could they keep their own diary. They were put in a situation where they had to share resources. Here, time was a constraining factor. This combined with the fact that limited access to one computer and the decision to formally dissolve the small groups in favour of a larger group resulted in the computer being shared to make the best of the available time. This factor should not be underestimated. It is a central aspect addressed by the idea of *collaborative spheres*, i.e., a situation where the collaborative task has an agreed objective that over time forms a structure to support the accomplishment of a complex task within a certain time (Orre and Middup, 2006). This situation thus saw a number of changes. Firstly, the small work groups were dissolved and formed into a large workgroup. This was not an easy step to take for any of those involved. The small workgroups had their own clients; they also had their own themes of conversations and their internal structure of authority. Even if each workgroup was used to the auction routine, they had their own criteria that needed to be met by the auction. In the new situation, new criteria had to be negotiated and the landscape of authority had to be remodelled.
The first thing a care assistant does when entering the meeting locale as part of the regular morning routine is browse through the group diary. This observation is not only valid for Alpha. In every group studied as part of this research, a paper diary was seen to play a central role in collective work. Whilst the reasons and objectives that guide this use might differ, the observation that the role of the diary is to inform and support coordination activities remains the same. It should be noted, however, that in home care there have been very few cases of well-thought-through technological support. Over time, home care assistants have learned to deal with any issues by constructing tools that serve their work, as in the case of the efficient coordination and distribution of work tasks. The transformation of the diary also had an effect on the number of diaries that were subsequently used. Instead of using four separate group diaries, the total number was reduced to two. One of these was used during the day shift and the other during the evening shift.

A second transformation stage - a shared group diary

During this stage, there were changes in the way that the group diaries were used. For a long time, separate diaries were used during the day and evening shifts. Now, instead of using these two diaries, someone (it does not matter who) suggested just using the upper section of a page for the day shift and the bottom of a page for the evening shift. The idea was innovative. It is a true example of a materialised practice innovation that, in an instant, provides a clearer view of the recorded events at the same time as it enhances communication between the two shifts.

In the second transformation stage, the role of the group diary was strengthened. At this stage, only one group diary was used to support workgroups in the small districts of Alpha, and this was used independently by the day or evening shift. For the first time, the group diary offered an overview of the most recent “need-to-know-about situations”. Here, the group diary is also shown to govern a set of rules for how it is supposed to be used. If anyone wished to add to it, the message had be to kept short in order not to use up too much space on the page and the message had to include the client’s code number. If anyone failed to follow these rules, it was quickly regulated by a straightforward discussion or a comment in the group diary. The rules were agreed upon to maintain clarity and structure. This indicates that the group diary is an important component in the social organisation of work.

The developmental process of the group diary meant that there had to be ongoing agreement between the care assistants about how the diary should be used. It is also important to note that the transformation of the diary is intimately related to factors which arise from the introduction of a computer.
into the morning meetings. These factors include the adoption of a renewed coordination style by the care assistants. There were no records of the group having previously used computers in their practice and, interestingly enough, the computer played a central role in the morning auction right from the start.

The style of the meeting dictates that the care assistants had to “use a shared space” in the same way they would have done with the group diary. In Alpha, the introduction of the computer did not lead to the technology being questioned or subject to real criticism; rather, it was the purpose of use that was discussed, such as routines of time and motion studies. The work group members that strongly believed in the positive effect of the work scheduling system enthused the other members of the group. Another factor was the introduction of mobile ICT. They represented a totally new take on the care assistants’ work and also put a new tool at their disposal. Handheld computers were introduced and used at this time but, as earlier chapters have revealed, it is difficult to estimate the impact of these devices in the early stages. Mobile ICT were said to offer more assurance in the work situation. However, these were not an ideal support in terms of how the group diary was used to inform care assistants about peripheral information or documentation work.

**A third transformation stage - “see computer”**

A later observation was that the diary started to lose its central role. The computer and the routines associated with it slowly gained ground. For a long time, the documentation for the care cases was kept in traditional binders. Besides potential efficiency gains, one of the motivations for the computerisation of home care in Alpha was to eliminate a fragmented and redundant information system. Throughout the development process, the number of binders decreased and, one by one, the care assistants incorporated the computer as the tool they used for documenting work. This relatively small group makes their work more efficient and rewarding by paying a lot of attention to talking about the clients. The need to consult cold files was not, therefore, that strong. Rather, it seems that the cues provided by the group diary uphold their discursive behaviour.

The diary and the register held in the computer were now maintained in parallel. Looking at the relationship between the group diary and the computer, it is possible to make a few indicative observations. At this stage, a few care assistants started to favour using the computer instead of the group diary. But in the light of the diary being the central information hub of the practice, they added the client’s code number in the group diary with the comment, “…see computer…”. The actual note or comment that belonged to
a particular house call and situation was found to be made on the computer. The information in the computer was linked from the diary, but not the other way around, since the register in the computer did not refer to the information kept in the group diary. The care assistants that now started to incorporate the computer in their work thus showed their respect for those care assistants that had taken the time to learn how to use the computer. At this stage, it is easy to identify early and mature adopters as well as those care assistants that belong to a group of late adapters; in other words, those that will not let go of the diary and those that have more or less already incorporated the computer into their work. The former group is the more interesting of the two. Do they continue to use the diary because it is convenient and less cumbersome than using the computer? In these cases, it turned out to be a question of false awareness that people benefited more from documenting work using the diary than the computer.

At this time, the smart phone was introduced. It was a much more advanced and better-thought-through product than the handheld computers used previously by the group. The handheld computer, as noted in an earlier chapter, was a passive resource in case work. It was not used directly; rather, in the majority of situations it was taken along ‘just in case’ it was needed. However, it was different for the summer deputies, who, finally, put pressure on the care assistants to be more careful about how they used the computer support. As they did not regularly participate in the ongoing discussions that took place, the information kept in the computer, and in the handheld computer in particular, was of great use to them. People who were not regularly participating in discussions needed to be assured that the information was correct and updated. Note that it was not the hot files that were under consideration. The deputies were actually referring to the update of the cold files. However, by focusing more time on maintaining the cold files, the care assistants started to incorporate more and more of the hot files as well. It should be noted here that mobile ICT play a key role. The deputies use these devices as their guide in the workplace. A passive resource for a person that knows the home care geography well is thus a direct resource for newcomers.
Figure 7.2. Three identified transformation stages found in the development of the group diary in Alpha show the incremental assimilation of ICT in a home care work practice.
Discussion

The developmental process of the group diary given above belongs to one particular work group. However, most groups encountered during this study have similarly used a group diary. Throughout this fieldwork, I have found that coordinative practices differ from place to place, even between groups managing the same task but in a separate room in the same building. Moreover, what the account given above highlights is that coordinative work practice is under constant change and development. The tools, as well as the ways they are incorporated, play a crucial part in this chain of development. If similar tools are used differently in “similar” work practices, such as home care, it indicates dissimilarity in the social organisations of work and how tools are structured (Hutchins, 1996). It is a self-evident situation; the social organisation is the engine of a work practice and since it relies on different individuals and personalities, the social organisation of a group is always unique and develops through a collective accomplishment. In chapter two, four features a practice support had to provide was discussed. While studying the use of the group diary, as well as its transformation, it becomes clear that these features also are features which are materialised in the group diary and those that can explain why it has been such an important and central resource in Alpha.

The first feature considered the openness of the system which is a main feature and characteristic. It allows both a low and high level of involvement adapts therefore to a wide array of information and behaviours. Here, novice users of ICT and those that reject and leave ICT for the others could for a longer period of time keep their ways without interfering with the ongoing development. In Alpha, three issues are observed to be particularly relevant. The first is the relationship between new technology and the re-organisation of the groups, and how this affected the use of other tools. The home care office in Alpha went through a radical change, initiated by the introduction of new technology that renewed the coordination style of the morning meetings. Note that the group chose to adapt the new technology to the coordination style they already had in place. They incorporated the new tool into the existing procedure, rather than abandon it in favour of a completely new way of accomplishing the task. The details for this coordination style have been presented in an earlier chapter. Another example of the effect of new technology is that when the group incorporated the computer into their coordination work, they also reconfigured their work to be managed by a larger group. It became difficult to work in small groups and, indeed, the computer did not allow such a work arrangement. Other constraining factors found were time constraints during the morning meeting and the complex management of the relationship between base and case activities. These resulted in the three groups having to adopt the unusual solution of sharing the com-
puter resource. This was exactly what they chose to do; they started using the computer at the same time, but as one larger group. The decision was of crucial importance for the development of the diary, as several of the developmental steps are directly connected to the merging of these three work groups.

The second feature dealt with the importance of people being able to choose between various communication channels in their communication with the group. It was also said that the influence of hierarchy and power relationships that belong to the work and learning context should not lead to discrimination in the choice of communication channel. Moreover, the second observation relates to how the diary is adapted and configured to best suit the situation. First of all, the number of diaries were seen to be reduced, until at some point only one diary remained. Here, the diary takes shape and is configured through negotiation, in which rules on how to make the best use of the shared information space are established. Basic rules, such as using the client code in all situations where a client note is present, belong to such a category and play an important role in the use of the diary. Even if the group diary never leaves the office, client codes are a simple and effective way to hide the identity of the clients, should it fall into the wrong hands. The renewed structure of the diary offers a shared view of ongoing events. In the same way as the care assistants add text, sticky notes, receipts and so on, the group diary is observed to play different roles. It is not only a resource for sharing ongoing activities. Care assistants also use it to communicate to themselves any past events that need to be remembered. The structure of the group diary offers a ‘broad’ categorisation of the information it contains. The content of the diary does not just address ‘hot information’; situations that deviate from the ordinary. It is also used for recording relevant information that is not held on the computer. Thus, a wide spectrum of information finds its way into the diary. The rules are less restrictive about what to include, so long as there is space left for the next interaction. The role of the group diary during this development process is that it served as an effective communication hub for a multiple number of interaction threads. The way that the group diary was modified incrementally and adapted to practice provides a view of how people collectively innovate and adapt to new resources that support shared work objectives. The information held in Alpha’s group diaries is evidence of a time document; it is not only used to communicate ‘hot information’ of direct relevance to the ongoing work, but also retrospectively captures ongoing changes that take place in the work place. It is a time machine in the sense that its content records any changes within the work place and these changes materialise in its design and configuration.

The third feature concerned contextualisation, which emphasised that the system should regard the cooperative process as a history of mutually related
communication and action events. A third observation in the use of the group diary reveals that situational and contextual factors are recorded and it concerns information about change on many levels of the practice. The observation are also related to the development and use of Mobile ICT in the workplace. First, the deputies play an important role in that they bring a totally new perspective to the argument that computer technology should be used carefully and thoroughly. In this situation the argument is clear: we cannot totally rely on everyone being present at any discussion. The view they bring to the situation is that the documentation has a practical relevance. The deputies played a crucial role in the shift of attitude, especially in the situation where the work group in Alpha abandoned the group diary in favour of the computer support. At this stage, the diary held more references to the computer than at any other time and the time was ripe for a shift to take place. In so doing, new routines took shape. In the same way that the care assistants used to browse the group diary every morning, they currently take a few minutes when they arrive in the morning to sit in front of the computer and browse through the ‘hot topics’ and files. One could of course ask why they do not use their handsets. In Alpha, the handsets are not synchronised until after the morning meeting is completed and the schedule is produced. Instead, and in the same way as the diary was circulated during the morning meeting, the care assistants queue up for a brief look at the computer before the auction begins.

The final feature addressed the importance of integrating communication and action flows. It was argued that these flows define the basic units of cooperative work, namely conversations and workflows. The identified inconsistency is that the diary represents a ‘misfit’ between digital media and work practice. It also offers evidence that the administrative view of the information - an explicit view - does not conform to that found in everyday practice. In Alpha, the view represented by the diary provides a structure which facilitates the maintenance of ongoing discussion about the elderly. At the beginning of this chapter, we considered the process through which the care assistants moved towards a final acceptance of the computer support as a replacement for the diary. However, it should be noted such acceptance can never be absolute. In a collective achievement, it seems more important to maintain structure. The interface could be redesigned and the notes displayed according to the demands articulated by the care assistants. Even so, the external pressure of the deputies seemed to offer the final argument to discontinue using the group diary in favour of the computer support. The only option was to either ignore or accept the relevance of the argument. It appears that, here, the use of mobile ICT was a key factor in providing suitable support for the deputies and that it seems answering to the needs of the collective practice.
In this study, it is revealed that if a comprehensive picture of the ongoing reconfiguration is to be attained the use of mobile ICT and the role it has in work practice has to be considered. The transformation of the group diary demonstrate how people and technology play equally important roles in the transformation of a practice. Constraints and needs are adjusting features that shape the tools as well as produce innovation as they are given roles that support social interaction. It seems to me that the group diary holds a unique account of how the use of ICT and other resources changes home care practices over time. On closer examination of and in relation to the discussion in previous chapters, the developments presented above reveal that mobile ICT seem to communicate a similar kind of information to that previously was communicated through the group diary. The fading use of the group diary combined with what the information it contains reveals, is an account of how new technologies are given meaning and the factors that seem to push the integration of new technologies in work practice, but also that there is a number of intricate challenges and effects when new technologies take on the role of previously used resources in the work ecology. One of these challenges is to decipher those codes in practice that reveals how different tools and resources are configured. Another strategy, is to find strategies and incentives which will support the care assistants in the workgroups, as is revealed above, in their reconfiguration of the workplace. It include supporting the discussions and negotiations in which rules and agreements of how these technologies should be used to best support the cooperative practice are decided.
Understanding Assimilation Processes

At the beginning, an initial and indicative definition of assimilation processes was offered and this definition was based on a theoretical knowledge of assimilation. I arrived at an indicative definition of assimilation processes as:

“...ways through which people learn, select and appropriate technologies in working practice...”.

The aim of this study was consequently to gain an understanding of assimilation processes and the ways that people learn and select different features of technologies in practice. In this thesis, it is revealed that assimilation processes can be understood as care assistants’ orchestration of different technologies; such an activity has an ecological character. It followed that assimilation processes were not only related to an incorporation of something new, replacing what was there before. It was as important to comprehend what the new technologies actually replaced. This was shown to be not one specific tool, but rather the wider use cultures and assemblies of tools and practices that were about to be replaced. It is an understanding which motivates use of a practice-oriented perspectives that deal with change, learning and innovation (cf. Orlikowski, 2008, Nicolini et al, 2003). In this vein, the question I raised was: how do care assistants assimilate new

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8 When I use the word ‘orchestration’, it is understood as the subtle ways that different tools and technologies are configured to support the care assistants’ work in the activity maintaining an orderly workplace. It also strike a chord with the ideas on *bricolage* originating from the studies by Lévi-Strauss (1966) which Ciborra (1996) employed in his ideas and views on ICT use and practice in organisational work.
emerging technologies in their work practice? It stemmed from a situation where the effects of the actual use of ICT in home care practice were poorly understood and documented. In previous chapters, the use of ICT was shown to play an important role in day-to-day activities.

Each of these chapters has presented an illustration of the character and direction of technology use in the studied home care settings. It is notable that the ways these technologies are learned, selected and appropriated by the care assistants as resources (cf. Ackerman et al, 2008) in their practice clearly challenges established views on home care practice. Moreover through the fieldwork the ideas and theories about the features these resources have is of true relevance. These features do not need to belong to a single artefact, they belong as much to the different activities and configurations of technologies the care assistants orchestrate. The empirical work shows that these features also support an understanding of the roles technologies play in assimilation processes and adds to theoretical understanding of them. The general character of assimilation processes are that they can with good reason, be understood as an ongoing activity having an ecological character (according to their true natural meaning). They belong to an open system, which can be influenced and directed, rather than an isolated activity. Assimilation processes do not belong to a single ICT implementation project, or a collection of such projects, in an organisation. They belong to the organisation as whole and involves the available web of technologies. Assimilation processes are ongoing, but not linear; they are rather recursive or circular in their disposition. To unravel these processes one have to focus on events that, at their core, have the potential to address change and innovation in the organisational landscape.

Before I go into the details about the change, innovation and effects of assimilation processes in home care and how they are realised, I will recapitulate some of the points that have been made during the discussion in the previous chapters. In chapter five, the issue – How do care assistants manage planning and coordination in their work? – found bearing in the activities that shape the morning meetings and ideas on how planning work can best be managed. The methods, or coordination styles, allow us to make a number of different interpretations of why and how they are applied. The examples show both care assistants being forced to follow a direct use recommendation using the manual, as well as care assistants following a process of adjusting and adapting the use concept of the technology to match their conditions. Note that coordination is also distributed through the widespread use of mobile ICT in fieldwork and provides an indication of the redistribution of activities and reconfiguration of the workplace through use.
In chapters six and seven, the question of – How do care assistants keep each other informed and aware of each other’s work? – found bearing in the use of mobile ICT which play a crucial role in changing methods of communication in day-to-day work. In chapter seven, this change is reasonably confirmed and we see the role of established tools slowly fading away. The use of the group diary fades away in favour of effective communication through mobile ICT and ICT. It is crucial to note that the support found in the features the group diary offered supporting the work practice by the care assistants now is found in the configuration of mobile ICT and ICT technologies. It is also noteworthy that this change and transformation took at least six years. From a management point of view, change over such a long period of time might seem a rather daunting prospect. When new technologies are involved in work practice, the integrated use of different tools and technologies – indeed, the whole system and configuration of the workplace – is changed. This change occurs on several levels and the third issue – What effects does the care assistants’ assimilation of new technologies have on the organisation of work? – provides the departure for the coming points and the closure of this study.

Social interaction reconfiguring the workplace

In the workplace depicted in this thesis, care assistants are dependent on the effective communication of relevant information that can be acted upon. They use features of different technologies that support the communication of such information. Care assistants’ use of the workplace and care assistants’ orchestration of technologies in the home care geography consist of the efficient use of physical and digital resources to coordinate collaborative work. In this sense, home care is another example of a hybrid ecology that supports cooperative interaction in emerging physical-digital environments (cf. Crabtree and Rodden, 2008). The involvement of ICT in home care is not only a matter of integrating new technologies with an existing technical infrastructure. It is as much a case of connecting care assistants and practices through the use of ICT. In the previous chapters, it is noticeable that work cultures influence and change the way that care assistants choose to use new technologies, such as ICT. Common to all the studied cases is that assimilation processes are truly recursive in character. Throughout the fieldwork it was observed that the care assistants often explicitly discussed the use and the role of certain features. They learned\(^9\) from each other by using the technology, either by observing how others go about it or simply by asking for help. In many respects, discussion is a way of reducing fear and anxiety when there is a change of circumstances. It does not matter if the discussions have

\(^{9}\) This does not refer to mandatory software use training; it is rather a direct reference to learning processes belonging to occupational communities.
a negative or positive focus; what does matter though, is that these matters are discussed. An observed difference is that the time available to the care assistants for using the technology varied between the different sites. In one workgroup the change is almost immediate for everyone, whereas in other workgroups it is observed that those care assistants who have a keen interest in the technology take the lead and the others follow in their own time. Independently of which site we use as an example, each repetition of any of these activities deepens the relationships between practice and technology use. In a sense, assimilation processes appear to be an evasive concept, one which slips through one’s fingers every time it seems within reach.

A particular aspect of home care is the need for cooperation and collaboration. This need permeates the practice and is manifested in a culture of giving (Orre and Watts, 2006). Here, the culture implies that the care assistants share information, give advice and ask for advice when problems occur. They uphold a practical sense of knowing to manage the tasks at hand, as well as the tasks that they might face the next day or even the next week. It holds that you share what you know for the sake of being informed yourself. I learned that this culture is one way to understand assimilation processes in home care, and indeed in any other practice that relies heavily on effective cooperation and collaboration. The internal organisation of the workgroups plays a particular role in how technologies are involved in making every effort to manage a tense work situation. In these situations of day-to-day practice, care assistants’ horizontal communication is a factor that has an immense impact on which technologies are appropriated and used by the care assistants. The use of artefacts, such as the group diary, the coordination styles and mobile phones that support articulation work in an activity are all good examples of this. The previous chapters have provided examples of artefacts, analogue and digital, advanced and straightforward, that support articulation work, and which also set a pointer towards activities that have a particular role in the accomplishment of everyday work.

“…This opens up new prospects for moving the boundary of allocation of functionality between human and artifact with respect to articulation work so that much of the drudgery of articulation work (boring operations that have so far relied on human effort and vigilance) can be delegated to the artifact, but also, and more importantly, so that cooperative ensembles can articulate their distributed activities more effectively and with a higher degree of flexibility and so that they can tackle an even higher degree of complexity in the articulation of their distributed activities!…” (Schmidt, 2006, p. 238; Schmidt and Simone, 1996)

The degree of flexibility for care assistants is indeed affected by the use of ICT and the availability that is offered through mobile ICT. The question
then is what are the effects of the digitalisation or computerisation of such artefacts in the practices in which they are assimilated and used? If this this line of questioning is followed, the role of the professional designer is questioned as design in this work can be understood as an ongoing process over time (cf. Suchman, 2007). It deviate from its conventional role in the setting studied here where the design process stops after implementation.

A central observation is that the communication structure in organisations is slowly changing. In this thesis, I have become acquainted with practices in which care assistants are nowadays dependent on interactive technologies. Interactive technologies, such as mobile phones, provide a well-adapted support in everyday practice, a support that is already available. These technologies offer communication channels in situations where it is a precondition that work practice deals with managing geographical constraints and work schedules that offer little flexibility of time. The use of these technologies points out where use occurs and which tasks are supported by using them. The observation is that the use of mobile ICT adds a spatial dimension that has to be accounted for. In this thesis, care assistants continually configure and reconfigure the workplace. It is a central aspect of the division of labour and ongoing coordination of work. Care assistants in home care continually try to maintain order, even if it is seldom spoken of as a precondition. They do so by using different technologies.

Figure 8.1. The configuration of the home care geography implies a constant shift back and forth between Base and Case domains in the workplace.

By placing the focus on social interaction, a different view of home care emerges. The view on interaction illuminates the constraints dealt with by
the care assistants in the day-to-day work, something that is revealed where use occurs in the workplace. Central in this activity are the two locales that can be found in the home care geography. In this work, I have termed these as the base, or office locale, and the case, which refers to the fieldwork locales. The activity of balancing work in these two locales maintains order in the workplace. The view on interaction also clarifies the constraints which arise from the spatial dimension of work. These add a significance to the understanding of how work and technology use are interconnected, providing the basic conditions that care assistants have to consider when organising their work. There is a clear link between practice and the character of use taking place in these locales, which clearly addresses the design and anticipated effects of new technologies. Two observations are of relevance here.

Firstly, it provides an alternative view on how quality in home care is produced. Quality of services is often measured in terms of safe, timely work, where there is a high degree of continuity. However, quality could also be measured in terms of the balancing act in effectively managing the spatial dimension, something that is accomplished on a daily basis by the care assistants. Thus, the quality of home care services is dependent on the care assistants’ ability to effectively balance case and base activities. It would therefore be totally misleading if quality of work and service were determined by only discussing one of these dimensions. Secondly, such a view on home care practice would also have a direct relevance for the context of technology use, as base and case domains are interlinked through care assistants’ collective use of different technologies. It identifies the particular use domains and the character of technology use within each of them. Each domain offers its specific conditions for use in the care assistants’ work.

Being aware of the factors that are central to the spatial configuration of the workplace gives an additional view on how a support system is tailored relative to its actual use context. Here, it highlights that the design of these support systems gives a very traditional view of what computerised work is about. It is obvious that they offer a support for care assistants’ activities in a base domain, which might be the result of having a strong legacy of traditional office work. The effect is that the unique features of mobile ICT that these support systems were expected to capitalise on and bring to the practice are missed. From this perspective, real and actual work seems to be overlooked, since care assistants find little motivation in using these technologies in the case domain as expected. Instead, social interaction through mobile ICT dominates, facilitating care assistants in developing new strategies to collaborate and coordinate more effectively. The know-how and theories that support the design of support technologies and which take these aspects into account are exemplified in chapter two. Current ICT support can offer a structure of work that, for some care assistants, makes work less cha-
otic and more rewarding. However, it seems that if insufficient attention is paid to ICT support, then it can have a conservative effect, in which development is reduced.

**Empowering effects in the organisational Landscape**

The political motives that underpin the introduction of ICT in home care are influenced by the idea that technology automatically adds positive qualities to an occupation. Through the deployment of ICT, it is expected that home care will become more attractive, not only for younger people but also, to a higher degree, for male care assistants. This seems to be clutching at straws; I do not see such expectations being met in the near future because it relies on ICT as a symbol. Other aspects of home care that could be considered include improved work conditions, higher salaries and better competence development. Admittedly, the symbolic side of ICT does matter, although only within the organisations themselves, i.e., in the workgroups. The symbolic character of ICT and mobile ICT was initially strong, but it quickly faded away as the technology was assimilated into the day-to-day work. Initially, it was seen as a sign of improvement in the status of home care work and the distribution of information was without doubt closely associated with motivations and feelings relating to being safe at work. All relevant information was available when it was needed. In the same vein, if a problem occurred that either needed a colleague’s advice or support, the mobile phone offered a quick response. The observations indicate, however, that there is more to the situation. Throughout the assimilation processes, the care assistants, as individuals and as workgroups, are given a wider space of possible actions in their work. The involvement of new technologies in these processes in home care is observed to challenge established structures and behaviours in the organisational playground. It does so on quite a broad scale.

The use of ICT deeply influences the workplace and it is an observation that is in chord with earlier studies and accounts (Zuboff, 1984; Kling, 1996; Dahlbom and Mattiasen, 1993). Zuboff (1984) put forward an explanation for the informing capacity of new IT, and the fundamental change of the landscape of authority that it would imply if a comprehensive informing strategy was to succeed. It is clear that similar effects are present and in motion in the home care workplace. These are in line with the development that Ghaye (2001) terms empowerment through reflection. In the transformation of home care, new technologies break the surface of established ideas, forcing the care assistants to reflect not only on the accomplishment of work, but also on how to approach and configure the ‘materials’ they use in order to achieve order in their cooperative practice; this occurs in a way that is similar to how a practitioner approaches the problem and the materials (Schön,
Similar goals are set by Jansson (2007) who explores different ways of moving towards empowerment and democratisation in the workplace through activities that stimulate reflection through involvement and participation in issues associated with the design and development of support systems and technologies.

The use of ICT is shown to serve crucial roles in sustaining work group autonomy. Indeed, in home care, care assistants manage an unpredictable workplace by continually gaining control of a shared workplace. Here, ICT becomes particularly important, not as a tool for enacting managerial control (managerial control initiatives are in many situations shown to be counterproductive), but as a tool that facilitates the delegation of responsibility to the individual whilst, at the same time, functioning as a crucial link between the individual and the community. What is out of the ordinary in the current transformation of home care is that the three central sources which in different ways regulate the relationship between autonomy and control are simultaneously being challenged and reformed.

My assertion is that the first source to be challenged is that the new routines for information management inform care assistants, giving them a comprehensive information view. The earlier fragmented picture presented by information repositories led to a great deal of redundancy. Nowadays, these repositories are replaced by centralised databases. Access to, and manipulation of, information is a fundamental source of control in any organisation and the procedures through which data is obtained, produced and distributed are now changing. In home care, the use of documenting features seems over time to facilitate the production of qualitative data and more rigorous documentation than ever before. It was anticipated that in procedures such as these, mobile ICT would be essential components. The effect that these technologies causes is that the workgroups’ internal organisation of responsibilities for certain information sources is changed. The task of keeping all information about a client in a binder is replaced by routines which use the documenting system. The care assistants’ motivation for documentation is, however, not to be found in instrumentally guided rules put together by administrators. It is rather motivated by the collective benefit of keeping group members informed. The distribution of information facilitated by a particular mobile ICT makes the care assistants more comfortable in their work. Having information available to hand is a motivation expressed by both experienced and temporary care assistants. This is in part an anticipated effect that is in line with the initial underpinning motives. However, the observation only concerns those workgroups in which information is distributed through mobile ICT, such as in Alpha and in a few workgroups in Gamma. In the other workgroups, the case information is still kept in the office.
The second source is the matter of who is in control of work scheduling and planning procedures. This differs between the coordination styles; in other words, whether the workgroup approaches the new technologies with an automatic-oriented approach, a computer practice oriented approach or a cooperation-oriented strategy. These strategies provide people with different capabilities for interaction. A central factor that regulates autonomy and control is the division of labour and the coordination methods through which it is accomplished. It is a matter of how far the individual care assistants can influence the work schedule. The situation pictured in chapter 5 reveals that the division of labour through these systems is managed in different ways. Each of them provides the care assistants with more or less control of their work. It relates more to the regulation of autonomy and control of the workgroup as a whole than to administrative efficiency. This observation opens up a discussion about how these technological supports could practically be involved and promoted. Whilst the use arrangement and the degree to which the planning module is involved in morning meetings differ, such differences lie between the use of ICT as a tool in the traditional collective activity of the division of labour, and the use of ICT as a tool for new professional work planners in home care. Traditionally, workgroups are used to cultivate the social relationships of control and autonomy as a collective, not as individuals. Differences between the workgroups lie in how collective the process is actually allowed to be during the morning meetings. From the observations below, I propose that there is not one true way of using the support system and each method has its specific sets of effects and influences on the social context. In the fieldwork, it was shown that:

In Alpha, where a cooperative-oriented approach is used, the workgroups have had much influence on how these new technologies should be used. The process has not been without its problems. However, by having an influence on the pace and the scope of the use of these systems in their work practice, the workgroups have managed to cultivate and seemingly keep some of the mechanisms that are crucial to maintaining an established collaborative culture. The workgroups in Alpha have managed to assimilate ICT as an almost integral part of collective articulation work, which makes them rather unique. When this situation has been presented and explained to home care administrators in other municipalities, they have said that this would not work in their workgroups because it is too advanced.

In Gamma, on the other hand, I found workgroups that very early on had to comply with a top down-oriented approach. This clearly did not give the workgroups the opportunity to influence the way in which new technologies could be introduced. There was more of a ‘take it or leave it’ situation, which radically changed the work culture over a very short period. Here, a new role was introduced: the planner. The administration underestimated the author-
ity the planner quickly gained in the workgroups. This was not even a situation that was anticipated by those who consented to taking on the planning tasks. At the same time, the role suddenly had a direct influence on the work schedules and the care assistants suddenly lost the chance to directly influence their schedules. At the same time, by these actions, the workgroups in Gamma were deprived of crucial resources for facilitating collaboration and interaction.

A similar situation is found in Beta, where the production of work schedules was also taken out of the meeting structure, with a similar effect to that found in Gamma. The result is that, in Gamma and Beta, planning became a professional task, involving a few people, rather than the whole group. This is a step back, not a step forward. An interesting observation is that in some work groups in Gamma, the care assistants found ways which allowed them to change and re-negotiate the computer generated work schedules. The care assistants in Gamma also chose to use the paper-based work schedules to support meetings and facilitate morning discussions. This reflects that the workgroups tried to regain a way of working that was lost by the automatic-oriented approach, and to retain control. The use of the paper-based work schedules is very much like the traditional routine that was found in Alpha; it is a situation worthy of note.

The third source is found in situations where the care assistants make use of the interactive capabilities provided by new technologies; their behaviour seemingly strengthens autonomy and control in the workplace for both the group and individuals (Bluedorn and Standiffer, 2005). The balance between demands in practice and control is a key to good working conditions (Bolin, 2009). The role given to mobile ICT in home care fieldwork is a typical example of situations where care assistants make use of the interactive capabilities they are given through these technologies. The use of mobile ICT, and the multitude of ways it is involved in practice, transcends formal responsibilities and traditional boundaries within the organisation. Mobile ICT is a central component in ongoing coordination work to maintain an orderly workplace. It is used to provide just-in-time information about changes in the previously negotiated work plan. Mobile ICT is a time-efficient alternative for solving practical problems in the workplace. Calling a fellow worker for advice or receiving calls from fellow peers is said to make the work more social and shared.

Mobile ICT is a control tool in the home care fieldwork. Its role is truly visible in the interaction with colleagues, but also in the interaction it allows with the clients. In situations where a visit has to be postponed or delayed. It could even be to call the landline number of an elderly person who is not answering the doorbell; in other words, acting as a second, and perhaps even
more effective, doorbell function. Mobile ICT is an effective interaction support, offering a transparency that bridges boundaries in the workplace and beyond (Ling, 2008). It quickly becomes part of intense collaborative activities. It also offers the feature of control in collective activities and a new autonomy for both the group and for the individuals. The developmental process of the group diary is evidence of this process. It also shows that care assistants ‘attentiveness to the needs of others in the workgroup leads to rapid reconfiguration of the web of technologies and how they are used. As a result, it is understandable that badly designed features are accepted, since as long as it is argued that its use is beneficial for the group as a whole, it will be involved.

The focus on assimilation processes reveals that care assistants choose to involve features of technologies as part of empowering strategies, which find bearing to the work of Ghaye (2001) who explains:

“...Empowerment is also linked to the ways in which people resist, confront and alter the 'structures' which serve to constrain thinking and action in certain healthcare work environments...” (p. 191).

The use of support technologies in home care nurtures an undercurrent of empowerment, which in this study is manifested in efforts to attain group autonomy and control of the workplace. It is an undercurrent in which care assistants in their practice search and finds ways of working to secure individual and group autonomy through different ways, as much as they can influence articulation work. In this process, technologies and routines are selected and configured with clear intentions. In many of the workgroups included in this study, these factors seem to be the driver, making sense of the ways that care assistants choose to involve technologies in their practice. In many of the situations, the administrators opposed this undercurrent.

Assimilation processes and innovation

Health care and home care development in the 21st century requires new and different approaches to learning through reflection (Melander-Wikman, 2008). This study reveals how care assistants manage physical and digital resources in practice and how they configure the workplace accordingly. Through their use of the different technologies at hand, the workgroups involved in this study show that they are careful in what technologies they choose to involve in their practice. There is a tension between practice and technologies which not only nurtures and fuels a discussion of the matter, but also an incremental adjustment and reconfiguration of both the technologies and the work practice. It strikes a chord with Jansson’s (2007) observation of how care assistants approach their work, and where their appropriation and use of technology is no exception.
“...that focusing on improving things, things that already works in practice even if they seems to be small and insignificant, creates opportunities for different kinds of conversation and these conversations opens up new possibilities for action...” (Jansson, 2007, p. 70).

New technologies are involved in work practice through a process where the care assistants carefully pick those features they find to have functional and supportive value in relation to the larger system of other supporting tools already in use. It is important to note that a central factor of assimilation processes, is that the care assistants are observed to question new and established routines. The latter, questioning established routines, play a crucial role in how new technologies are involved in practice taking the practice forward. Equally important is the fact that features are carefully selected through debate. When established routines are challenged, their role and purpose becomes visible; they are no longer embedded in ordinary thinking. Instead, the use of new technologies produces tensions between explicit and tacit views of work. It is through such tension that we find care assistants negotiating their viewpoints and opinions. These relate to work roles, rules and conduct, authority, delegation and so on. It is a necessary tension in any transformation process where people are adjusting to external and internal changes of new work conditions, which can take practice forward. Assimilation processes, as a collegial and collective process, establish reflection on practice, not only by learning more about the use of features, but also about work and practice and how it can be performed differently; in the earlier sections, this is noted to have an empowering effect (cf. Ghaye, 2001).

During and through these activities, the discussion offers a social space of innovation, where new ways of working, such as routines, and the use of the technology are discussed and examined in a critical way. It is a regulating factor in the workplace and a culture that is governed and cultivated in these groups. The social space of innovation is also an expression of the care assistants’ need for orderliness in the workplace and their efforts to maintain this. Before the introduction of ICT, the care assistants either used or produced their own tools collectively in ways that supported documentation schemes, articulation and planning work and so on. A wide range of change initiatives fuel the current transformation of home care. Whilst ICT-related initiatives are just one of many such initiatives, it is sometimes difficult for the care assistants to keep them apart. Being forced to cope with change on such a broad scale produces the risk of becoming easily tired of coping with changes to programmes and initiatives. Nevertheless, the care assistants adjust to new conditions and new technology in a carefully considered manner. Collectively, rather than individually, opinion is of more relevance here. If they found a feature to be of practical relevance in practice, it was negotiated and integrated into their collaborative innovations; if not, it was rejected and not
used until a motivating argument initiated a new discussion of the matter. In this process, peers in the work group who are more capable of using the device offer helpful advice on how to go about work, but also, and just as important, they get involved in questions that facilitate discussions about practice. These discussions are clearly a crucial component in the co-evolution of work practice and the use culture surrounding the orchestration of new and old technologies. The use of new tools nurtures an ongoing discussion of how to practically go about work, clearly showing that technologies are socialised and transformed in the process (Orr, 2006).

![Social space of innovation](image.png)

Figure 8.2. The social space of innovation.

This thesis reveals that the work culture resiliently influences how technologies are used and involved in work. The work culture continually shapes ideas and motivates the group collectively as they approach a new technology. It is a crucial component in a shared achievement in the innovation of new routines and the configuration of assisting technologies. It seems to me that, in most situations, care assistants’ individual ideas about use and their exploration of the technologies are a factor in this collective discussion. Care assistants do not accept new routines right away; the routine is rather that they begin with a discussion. A glimpse of such a process was found in the development of the group diary presented in chapter seven. This is of course a culture that has evolved over time. It provides a first insight into how new technologies are assimilated and become part of the ongoing transformation of practice.

It also show that the level of care assistants’ knowledge about technology in home care is anything but low. People have been forced to produce and innovate advanced technological communication tools long before the introduction of ICT brought about by the modernisation of home care. The differences are that, whilst ICT offers a collection of many features, the care assis-
tants cannot manipulate the design directly. Although they cannot make radical changes to the design, they can decide on which features to use and configure these with other supporting technologies at hand. The combination of different technologies can thus be seen as one way of ‘manipulating’ and adjusting the technology according to the local conditions, which shows that innovation is a truly distributed process.

Some final notes on assimilation processes

Critical research into ICT in Scandinavia has always striven to involve users’ views of practice in design and system development in different ways (Ehn, 1988; Jansson, 2007). The aim has not been to avoid resistance, but to capitalise on critical discussions that would potentially be reflected in the design of ICT systems. Furthermore, such research also pave the way for the role of ICT as a democratising tool in the organisation. Studies with this legacy can be found in the context of home care (cf. Jansson, 2007). In all the organisations, initial resistance and lack of enthusiasm met any change initiatives. The degree and scope of such a reaction did differ. It is easy to talk about the problems they come across; the introduction of ICT is no exception. Through group interviews and the QPB session, I learned that resistance was a sign of fear for things they did not yet know. It also expressed a tiredness of coping with a multitude of simultaneous change initiatives that are currently take place in elderly care organisations.

Nardi and O’Day (1999) focus on the use of ICT, asserting that as responsible as the designers are for making the design as good as it can be, the users are just as responsible for involving the technology in their care activities. To establish ownership of the technology, they suggest that a better way of working is to introduce strategic questioning among occupational representatives before a practical implementation of technologies. By discussing possible effects, advantages and disadvantages, problems such as bad design and resistance could thereby be avoided. A central point in the fieldwork underpinning the thesis, is the positive role resistance and scepticism shown towards the new routines have advancing work practice. It is rather the ways in which the technologies is used that level the ground for empowering or disempowering activities and effects, shaping and configuring the technologies. When the care assistants were given time to learn new features in collaboration with others and the features were allowed to be discussed, resistance faded away. The complexity in the use of these tools and the tools themselves make it almost impossible to value the possible effects. The development and effects of the studied assimilation processes in these three organisations to date reveal the complexity of the latest technologies. They take considerable time to figure out, both in terms of use and in terms of their effects for the organisations as a whole. Resistance, is a crucial factor in
assimilation processes. New technologies will, as expected, be seen as enemies of established routines and practices that are already in place. This is a natural reaction; we fear what we know little about and, most of all, we fear change. But it offers also a golden opportunity for development and advancement of practice through participation. In this thesis, I have presented a critical perspective on the use of technology in home care; one that adds new dimensions to how its use in the workplace can be understood. The involvement of ICT in any organisation is not easily understood. A challenge here is to grasp how a view on assimilation processes of support technologies can be used strategically and approach utilisation of ICT with an approach that offer sustainability and at the same time consider those innovations that are a result of dealings with everyday work.

The complexity of ICT and mobile ICT almost presupposes a gradual change in which the ongoing discussion that characterises the social space of innovation plays a crucial role. Development over time addresses different levels of innovation in the process. Innovation refers here to change and re-configuration of organisational practice and technologies. Mioduser et al. (2003) discuss three general levels of innovation, where each of them deepens the relationship between use of technology and practice. In their discussion and their contextualisation of these levels, the authors study how ICT can change work practice within education and teacher practice. The first level is assimilation, the second concerns transition phases and finally there is the transformation level, in which practices and new behaviours change. This work recognises that assimilation processes are recursive in character and, thus, the social space of innovation is a crucial and inherent feature in the whole process, independent of whether we choose to discuss it in terms of assimilation, transition phases or transformation.

On the one hand, this work provides examples of the role that established behaviours can play and why it is important that they are recognised for what they are. We learn to trace their evolution as potential solutions to recurrent design problems (Spinuzzi, 2003), but also to realise recurrent workarounds in the organisation. Whilst many, although not all, of the resulting innovations are short-lived, they do gradually refine the use and moulding process of ephemeral innovations and latest technologies. On the other hand, this work provides examples of where new technologies and innovations offer an architecture in which different behaviours are allowed that are not associated with previous work tasks. This is an ‘architecture’ that is not well-known among the members of the organisation; it is new and it brings new challenges to the surface. In this thesis, the practices taking place in this architecture illustrate how the configuration and the reconfiguration of workplace interaction is set and managed.
Although the home care workgroups studied in this thesis appear to be ‘islands of innovation’, they all share a character and effects that adhere to assimilation processes in the ways which they have been transformed, until now. The challenge identified here concerns the relationship between innovative practices using ICT and the prospect of them being transferable to other groups in order to support sustainable approaches to ICT in service organisations. Following on from this is the idea of architectural knowledge by Henderson and Clark (1990), which points out the importance of being sensitive to the aspects of current practices that could be sorted out, retained and selected to create innovations and those that can be left aside. In home care, such innovations are found in innovative ways of managing technologies and their involvement in practice, not only in the interaction with the clients, but also the interaction between the members of the workgroups. It is thus a situation which calls for a sensitivity in managing social interaction in the workplace on several levels of the organisation, which earlier chapters give examples of. To establish such sensitivity guidance can be found in ideas that deal with new perspectives on the ‘architecture’ of the organisation and in ideas that set its focus on crucial mechanisms and tools of cooperative practice and interaction. The perspective offered by - using technologies with care - suggests a different view on innovation. Such a view focuses on innovative use and workplace configurations, as it is aware of novel technical configurations.
References


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Appendix

Figure A1. The meeting room and the different information repositories and technologies in Alpha
Figure A2. The meeting room and the different information repositories and technologies in Alpha. The workgroup moved office during 2004.
Figure A3. The information repositories and technologies in the meeting room in Beta.
<table>
<thead>
<tr>
<th></th>
<th>Which are the effects of MO in your practice?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Shortening in time</td>
</tr>
<tr>
<td>2.</td>
<td>Saving time</td>
</tr>
<tr>
<td>3.</td>
<td>Saving time</td>
</tr>
<tr>
<td>4.</td>
<td>Work is smoother</td>
</tr>
<tr>
<td>5.</td>
<td>Better devices (a comment on the new Pdas)</td>
</tr>
<tr>
<td>6.</td>
<td>Smoother, faster</td>
</tr>
<tr>
<td>7.</td>
<td>Notes</td>
</tr>
<tr>
<td>8.</td>
<td>Replaced the all the notes, all the information about the client is in the Pda</td>
</tr>
<tr>
<td>9.</td>
<td>Quick information, work task is safer, information about the other’s work schedules and where they are</td>
</tr>
<tr>
<td>10.</td>
<td>Easy access to client information</td>
</tr>
<tr>
<td>11.</td>
<td>Work tasks at the client</td>
</tr>
<tr>
<td>12.</td>
<td>Easier to get information about the clients</td>
</tr>
<tr>
<td>13.</td>
<td>Better overview</td>
</tr>
<tr>
<td>14.</td>
<td>Makes the work easier</td>
</tr>
<tr>
<td>15.</td>
<td>Saves time and makes the report work more secure</td>
</tr>
<tr>
<td>16.</td>
<td>Have made the work scribbling on notes and paper much easier</td>
</tr>
<tr>
<td>17.</td>
<td>Time and motion studies</td>
</tr>
<tr>
<td>18.</td>
<td>Fewer people working</td>
</tr>
<tr>
<td>19.</td>
<td>They are making changes in our program</td>
</tr>
<tr>
<td>20.</td>
<td>It is threatening that MO will make us too effective and that it will change our working hours</td>
</tr>
</tbody>
</table>

**Figure A4.** A rough translation of the QBP-answers given 2006 in Alpha. Note that each of these answers generates a clarifying question from the moderator, and a starting point for discussion and reflection.
The work schedule was in the Pda presented as seen to the left. Note the two underscored words in the top left corner: Kunder (customers) and Personal (Staff). These two provide access to information about the elderly under care (Kunder) and the work different colleagues work schedules.

The screen shot shows more details about Mr El Gabali, which pop up if we chose to tap on his name in the top section of figure 3. This is the view, which is referred to if an emergency will occur to Mr El Gabali. All the necessary details his available; note that you need to scroll down to get the full picture, all the information provided is not displayed in the figure.

The information that is displayed while tapping with the stylus on the name of the customer Karim El Gabali in figure 2. Noteworthy here, is that it concern one task, to assist Mr El Gabali with his lunch, which is displayed in bold (Mat). There is also a note on what to pay attention regarding this particular task, which is found in the bottom of this figure. It is noted that Mr El Gabali does not eat pork, due to his religious belief. It illustrates also a simple example of that mostly every one of the persons under care does have some need-to-know aspect/s that must be considered while taking care of the assignments.

**Figure A.5.** The presentation of the work schedules and the client view the care assistants see when they use JoLiv Mobile care.
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**1998**


1999


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2001


2003


2005


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