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The studies revealed that people's efforts to configure the current context create and reflect a 'place of collaboration'. In other words, the effort to configure the context results in a practice characterized by an understanding of how to cooperate; a collaborative practice that constitutes a 'place of collaboration'. During this configuration, the space and the use of materiality in this space are important parts in the creation of a place of collaboration. In addition, people configure collaborative contexts of intersecting practices by creating boundary objects. Boundary objects serve as mediators in a place-making process for the integration of places into a 'place of collaboration' for several practices. What is more, the dynamics of a place of collaboration may affect changes in existing modes of working and in computer-based tools that have been introduced into the workplace. The people and practices that constitute the place will in turn re-configure the place of collaboration, including the space and objects available due to the new circumstances.

People's configuration of their current context reveals crucial aspects about the place of collaboration that must be considered also when designing to support this setting. However, this configuration may not necessarily equal efficiency and effectiveness, as evaluated by actors external to this context. The conclusion of this thesis is that future research and design should consider how to support people in their own effort to configure their collaborative context.
Design for Places of Collaboration

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Abstract

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Acknowledgements

It is something of a platitude to call the thesis work a journey. The thing is that journey is precisely the right metaphor to describe the work of completing a thesis. In my case, it was a challenging journey filled with experiences, interactions and, most importantly, creations of different places of collaboration in connection with a number helpful colleagues and friends that I wish to acknowledge. The following list of appreciation is in no particular order.

I want to thank Bo Helgeson, Päivi Jokela, Kjell Arvidsson, Staffan Carius, Rune Gustavsson, Göran Petersson, David Richardson and Alastair Creelman for helping me and providing me with the necessary resources for this research effort. I also want to thank the sponsors of the different projects and studies discussed in this thesis, that is, the Kamimo Project, the eHealth Institute at Linnaeus University (previously the University of Kalmar), and the Swedish Agency for Innovation Systems (VINNOVA). I furthermore want to thank all the unnamed participants in these studies. In addition to this, I want to extend my gratitude to all my colleagues during these years. Two of them, Patrik Brandt and Hanna Danielsson, deserve special attention. I want to thank you both for being not only great co-workers, but also good friends.

I wish to extent my warmest gratitude to Bo Helgeson and Päivi Jokela (again) for the supervision of my Ph.D. thesis. You challenged me and believed in me at the crucial times when I otherwise probably would have ended this journey too early.

Finally, I am especially thankful to several persons in my private sphere for their well-needed support and for pushing me forward. My deepest gratitude to all of my friends (you know who you are) and to my family Elias Petrakos, Anastasia Petrakou and Pavlos Petrakos.

Πατέρα, Μητέρα, Αδερφέ μου - αυτό είναι για εσάς.

Kalmar, March 2011
Alexandra Petrakou
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Report
Chapter 1: Introduction

This thesis contributes to an effort that was initiated in the interdisciplinary research area of Computer-Supported Cooperative Work (CSCW). In brief, CSCW research aims to understand the nature and requirements of cooperative work to better support it with computer-based technology. The intention with the present thesis is to produce insights into the real-world conditions that are essential for the development of CSCW technology and conceptually interesting for CSCW research.

In essence, the present work contributes to the understanding of, and design for, collaborative settings by introducing the perspective of ‘places of collaboration’. The elaboration of this perspective is partly motivated by current research concerns within CSCW, and partly by my own empirical findings that emphasise the importance of understanding peoples’ abilities and adaptabilities when working together. This thesis is also motivated by the concept of ‘cooperative work’ as a distinct category of work. This category suggests that individuals are required to invest extra ‘work’ for the purposes of cooperative work. ‘Work’ here implies a mastery of all sorts of techniques and includes the effort a person puts into an activity. In this respect, to truly understand cooperative work we must understand ‘work’, and thus the effort people put into cooperative work has to be acknowledged.

The overall research aim is to explore people’s own efforts to configure their current context for the purposes of collaboration. During this thesis work, four different collaborative settings have been studied in situ through different forms of ethnographic inquiry. The studies are reported in six papers that are enclosed in this thesis. While each setting was studied with different focuses on collaboration, they all show important aspects of people’s own efforts to configure their current context for the purposes of collaboration. In this investigation, I examine and make a theoretical reflection on four collaborative settings based on the concepts of ‘place’, ‘space’ and ‘boundary objects’.

In the following sections, I start with a theoretical background which includes some history of CSCW and a clarification of the concept of cooperative work. This is followed by an outline of the design challenges and research concerns within CSCW. The chapter is concluded with a clarification of the thesis aim and rationale, as well as an account of the thesis outline.
1.1 Computer-Supported Cooperative Work

The research field of Computer-Supported Cooperative Work (CSCW) was initiated during a workshop in the mid-1980s, and connects several research disciplines from social science and computer science. The motivation was a common interest in studying and supporting group work with technology, which at that time was labelled groupware (Greif, 1988; Grudin, 1994a, b; Johansen, 1988). During the following years, the interest in CSCW-research increased due to several concurring reasons, including technological developments, transformed business environments and dissatisfaction with conventional Human-Computer Interaction (HCI) research (Heath and Luff, 2000). In particular, the methods and models used to understand human actions within HCI and Artificial Intelligence (AI) research were questioned (Suchman, 1987; Winograd, 1986; Winograd and Flores, 1986). In this respect, Suchman (1987), through a study of the human-computer interaction of an expert help system attached to a photocopier, made the deficiencies of the plan-based models of human action that underlay the interface design within HCI and AI visible. Suchman then argued for the importance of understanding the situated character of human behaviour and action. Additionally, technological developments in concurrence with better use of computer networks and E-mail were able to enhance and support communication, information dissemination and collaborative work over distance. As a result, new research challenges emerged to support multiple people interacting through computers. The shift from a single-user to a group-user perspective for computer support also reflected the industry’s demand on improved information and communication systems to support coordination and group activities in the transformed business environment (Grudin, 1994a; Heath and Luff, 2000; Rodden and Blair, 1991; Schmidt and Bannon, 1992).

Changing the perspective from supporting single-user applications to support group work was an effort not without challenges and it was shown that the early groupware systems failed to support the context that they were developed for (Grudin, 1988; Heath and Luff, 2000). The main argument was that the design of such systems did not take into account the situated character of work, and that “group work” defined the collaborative context too narrowly (Heath and Luff, 2000). As a reaction to the failure of computer systems to support various work contexts, IT-researchers stressed the need for understanding of socially organised situations and settings that would
better employ the developed systems (Crabtree et al., 2005; Hughes et al., 1991; Schmidt, 1994). Influenced by ethnographic and ethnomethodological studies of work, such as Suchman (1987), a growing body of studies of work contexts in situ, referred to as ‘workplace studies’, emerged as an important methodology for CSCW research (Heath and Luff, 2000).

Furthermore, researchers from the social science field elaborated on the concepts of ‘group work’ and ‘cooperative work’ to define the meaning and scope of CSCW research. Bannon and Schmidt (1989) argued that the term group work restricts the scope of CSCW research since group work may be characterised as a specific form of cooperative relation. They further claimed that the term ‘cooperative work’ is a more general and neutral term referring to multiple people working together, without implying a particular degree of participation or self-determination. According to Schmidt, cooperative work “...emerges in response to the requirements and constraints of the transformation process and the social environment on one hand and the limitations of the technical and human resources available on the other.” (Schmidt, 1994, p. 352)

Schmidt and Bannon (1992) further argued that cooperative work not always corresponds with formal organizational structures, since people engage in cooperative work when they are required to cooperate to get the work done. Mutual work dependence is a core aspect of the emergence of cooperative work arrangements. In this light, it was argued that CSCW research should comprise the rich diversity of cooperative work arrangements that define the boundaries of these arrangements by actual cooperative behaviour. Thus, useful CSCW systems must stress the need for understanding the complexity of those arrangements (Bannon and Schmidt, 1989; Heath and Luff, 2000; Hughes et al., 1991; Schmidt and Bannon, 1992). Based on this, the main endeavour of CSCW research adopted by many researchers is to “...understand the nature and requirements of cooperative work with the objective of designing computer-based technologies for cooperative work arrangement.” (Schmidt and Bannon, 1992, p. 5).

With this focus, and in combination with studies of work settings in situ, CSCW research has experienced a shift in the perspective of computer science in relation to the social world, so that the field now also includes a social understanding of the design of computer systems. Parallel to that, sociological research has begun to consider advances in ICT. These new foci
entail a direct and an indirect contribution to systems design and technology development, as well as an attempt to conceptually evolve the area of CSCW per se (Schmidt, 2009).

1.1.1 Understanding cooperative work

From a sociological perspective, the notion of cooperative work may be understood from different viewpoints. According to Hughes et al. (1991) cooperative work can be interpreted as a specific category of collective work, but also as a type of work that may be considered ‘helpful’ or ‘harmonious’. They further state that all work can be analysed as socially organised since work cannot exist outside a collective context. In doing so, they question any view that defines some work as individual:

“...there is a mass of ‘individual’ tasks that have been relatively well served by computer support but there is now a separate set of ‘cooperative’ tasks for which we need to derive specialised techniques for computer support. We maintain that all work is (amongst other things) socially organised; that most significant tasks are complexly social; and that it is largely for this reason that they have sometimes been poorly served by computer systems.” (Hughes et al., 1991, p. 313-314.)

In elaborating this issue, Schmidt and Bannon (1992) pointed out that although work is always social, at the core of the concept of cooperative work is the notion of interdependence in work.

“Because of this interdependence, any cooperative effort involves a number of secondary activities of mediating and controlling these cooperative relationships......cooperative workers have to articulate (divide, mesh, allocate, coordinate, schedule, interrelate, etc.) their distributed individual activities....That is, compared to individual work, cooperative work implies an overhead cost in terms of labour, resources, time, etc.” (Schmidt and Bannon, 1992, p. 7-8)

In short, while Hughes et al. (1991) outline a perspective on work in which the sociality of work is in focus, Schmidt and Bannon (1992) outline cooperative work as a distinct category of work. This category requires individuals to invest extra work precisely because of its cooperative nature.

In recent years, the concept of how cooperative work responds to the changing technological landscape, and how this affects the research context, have been discussed (Crabtree et al, 2005). New technological possibilities and a change of focus from work places to collaborative activities outside
working life, make it tempting to abandon the W in CSCW. As Schmidt (2007) rhetorically asks: why not state that CSCW should address IT-support for human communication and interaction in general? According to Schmidt (2007) the answer to this question lies in the definition of ‘Work’:

“For an activity to account as working, its performance must satisfy constraints and requirements that in the modern world typically are externally defined...Work demands the best: it requires skill and training, stamina and effort, dedication and attention.” (Schmidt, 2007, p. 45).

Following the discussion by Schmidt (2007) and Star (2010), the concept of work includes activities faced with serious effort and complexities. Work is mastery of all sorts of techniques and includes the effort a person puts into an activity, including activities outside working life. For example, Star (2010) highlights that work also includes cooperation around serious play activities such as skiing. In this respect, to truly understand human communication and interaction, we must understand work and the effort people put into to work has to be acknowledged.

1.2 The design challenges
In essence, CSCW research is a design-oriented area. This implies that the process of design relates not only to the particular tool that is designed; the design process participates in a wider context of changing the organization of social practices that the design is aimed to support. As Winograd (1986, p. 203) points out: “We are designing (or re-designing) the work, not just the tool”. In this context, CSCW research is not only driven by technology, nor is it exclusively socially oriented. The focus is to understand in order to better support cooperative work with the design of computer systems (Bannon and Schmidt, 1992; Fitzpatrick, 1998). This implies an effort to change perspectives for all researchers involved in the CSCW agenda, an effort itself not without challenges. Considering the endeavour of CSCW research, Fitzpatrick (1998) positions that understanding and designing are the key activities of CSCW research so that the overall challenges are:

- Understanding cooperative work for the purposes of design.
- Designing systems for the purposes of cooperative work.
- Supporting the communication gap between how work is understood and how systems are designed.
The first challenge concerns understanding cooperative work for the purposes of design. This understanding involves primarily qualitative methods and the most commonly used methodologies are ethnography, grounded theory, evaluation of systems in use, and meta-analyses of other studies. Furthermore, the most common theoretical perspectives used to collect and analyze data to understand the nature of cooperative work are ethnomethodology and symbolic interactionism. These perspectives account for a sociological understanding of the nature of cooperative work and provide different focuses in order to inform design (Fitzpatrick, 1998). Over the years, the methodologies and theoretical perspectives, and their relation to system design, have been considerably debated. In particular, system developers who seek ways to interpret the sociological studies for the effort of the second design challenge for CSCW have been keen to discuss these issues.

The second CSCW design challenge concerns how to design systems for the purposes of cooperative work. Traditionally, computer science has been concerned with problems that can be specified and categorized as requirements and for which solutions can be evaluated as being right or wrong. Drawing on a traditional engineering background, the system designers’ endeavour has been to find an algorithmic solution, where an important factor is to find the right abstraction (Fitzpatrick, 1998). It is commonly agreed that the difficulties with creating CSCW tools come from the lack of shared abstractions between social scientists, computer scientists and users. Fitzpatrick (1998) describes this situation as a struggle for computer scientists to translate the social understanding into a design effort. At the same time, social scientists struggle to understand what it is that computer scientists need when designing and how they may communicate their own insights to influence design decisions. This struggle is referred to as the communication gap (Fitzpatrick, 1998).

The third challenge of CSCW design is derived from the two above stated challenges, that is, how to support the communication gap between how work is understood and how systems are designed. Fitzpatrick (1998) further positions the communication gap caused by the different world-views of the use of abstractions. This implies that while social scientist use abstractions to describe what has been studied, computer scientist use abstractions to specify and restrict the system to be created (Fitzpatrick, 1998).
Undertaking the three challenges entails finding methodologies, theoretical perspectives and abstractions that allow the application of social understanding of cooperative work to the design of CSCW systems. Dourish (2004) defines this effort as Social Computing and argues that this is a different effort from either sociology or system design in that it includes different goals and methods. More than a decade before, the same viewpoint was put forward by Hughes et al. (1991) who stated that the challenges for sociology in engaging in CSCW entail focusing on the contribution to systems design. During recent years, research that has centred on understanding cooperative work and studies with a technical design focus have influenced each other, contributing to a co-evolution of the CSCW perspective. Thus, technical design concerns have had an impact on the methodologies and on the theoretical perspectives used to understand cooperative work. At the same time, concepts from social understandings of work have had an impact on different aspects of design. This implies that ‘understanding’ and ‘designing’ for cooperative work is an iterative process in which new theoretical perspectives provide new insights that must be taken into account for further understanding about the nature of cooperative work and the design of technology that supports this work.

In recent years, there has been a growing debate about the future of CSCW research and the development of CSCW tools. The CSCW research community seems to acknowledge that social understandings and design efforts in CSCW research have to take a step forward. In particular, this step involves an effort towards generating conceptual and design approaches for the development of CSCW technologies that are applicable across a variety of cooperative settings (Robertson et al., 2010; Schmidt et al., 2007). In essence, these research concerns call for a complementing focus for both the ‘understanding’ and the ‘design’ activities of CSCW. This focus includes an understanding of both the specific settings and the more general characteristics drawn from a variety of settings, but also relates to specific systems design and a more generic technology development. With these research concerns as a starting point, the need for perspectives and abstractions seems to be even more important. However, in order to understand the general characteristics of cooperative work for a more generic technology development, in-depth studies of real-world conditions are of utmost importance. In this respect, this thesis provides one such attempt. Starting from a bottom up approach, the thesis aim is motivated in the following section.
1.3 Thesis aim and rationale

Following the general endeavour of CSCW research, the intention with this thesis work is to produce insights into real-world conditions that are essential for the development of CSCW technologies and conceptually interesting for CSCW research. To realise this, ethnographic studies have been conducted of four collaborative settings: elderly care at home (Petrakou, 2007; 2009), online education (Petrakou, 2010), care work at a hospital clinic (Petrakou, 2011) and the local food sector (Petrakou et al, 2011a, b).

The aim of these studies was to understand the collaborative settings for the purposes of design. In addition, they were focused on different aspects of collaboration and the ethnographic approach varied due to the situation of each research context. While each study was initiated in different ways and conducted with different focuses on collaboration, they all revealed important aspects of how people configure their current context for the purposes of collaboration. The starting point for this understanding emerged during the field work of the study of the setting of elderly care at home. In this study we came across the SVOP binder. Placed in the patients’ home, this binder was created by the care workers and contained a collection of material that the care workers themselves considered as important for supporting collaboration between all parties involved in the process of elderly care, including the patient himself/herself.

In retrospect, my understanding of all the studies is that people’s ability to adapt to working together is a core aspect that must be taken into account also in the design of technologies that support these collaborative arrangements. To explain and explore the general characteristics of this situation, I examine the conducted studies in this cover paper by using some core concepts from CSCW literature. More specifically, I use the concept of ‘place’, ‘space’ and ‘boundary object’ for the following overall research aim:

The aim of this thesis is to explore people’s own efforts to configure their current context for the purposes of collaboration.

In this respect, ‘configuration’ implies the tools and norms designed by the people that make up the setting. Furthermore, ‘context’ implies the setting
with its specific surrounding and circumstances in which the people and their practices are situated.

The research aim was primarily evolved based on the results of the four studies. In addition to this, my motivation is also based on the concept of cooperative work as outlined by Schmidt and Bannon (1992) who state that at the core of the concept of cooperative work is the notion of *interdependence* in work. In addition, cooperative work includes activities characterized by serious effort and complexity, some of them taking place outside working life. Work is a mastery of all sorts of techniques and includes the effort a person puts into an activity (Schmidt, 2007; Star, 2010). For better readability and to minimize misunderstandings and misinterpretations of cooperative work as merely working life, I use the concept ‘collaboration’ interchangeably with ‘cooperative work’.

To summarise, starting from a bottom up approach, ethnographic studies were conducted on four collaborative settings. Accordingly, the overall research aim evolved based on my own empirical findings. To investigate the research aim, I made a theoretical reflection and examined the conducted studies by using current core concepts from CSCW literature. More specifically, I used the concept of ‘place’ in relation to ‘space’ and ‘boundary object’. As a result, the examination generated material conceptually interesting for CSCW research. In essence, the main contribution of this thesis is a perspective which I call ‘places of collaboration’.

### 1.4 Thesis outline

This thesis consists of two parts; this cover paper constitutes the first part while the individual research papers make up the second part. In order to explain and explore the overall research aim, this cover paper is outlined as follows.

In chapter 2, I account for the methodology and strategy of inquiry. This chapter also provides a further motivation for the thesis aim and investigation approach. More specifically, the chapter presents an account of ethnography in general and describes how it has been used for the purposes of the development of CSCW technologies. The chapter also includes descriptions and reflections on each studied collaborative setting and the research contexts.
for the studies. Chapter 2 concludes with a reflection on the emergence of the overall research aim and on the strategy of inquiry for this investigation.

In chapter 3, I outline the theoretical framework for the concepts that are used for the theoretical reflection and examination of the research aim. The central concept is ‘place’, ‘space’ and ‘boundary object’. In addition, the chapter includes a discussion of how the concepts ‘place’ and ‘space’ have been used as a perspective within the CSCW field when understanding and designing for cooperative work. The chapter is concluded with a summary of the theoretical framework.

In chapter 4, I examine and reflect upon the main findings of the studied settings. More specifically, for each setting I first outline the circumstances surrounding the setting and then describe how the people in the setting configured this context for the purposes of collaboration. Finally, I reflect upon these findings based on the theoretical framework. An exception from this structure is the study of the local food sector. For this setting, the circumstances and configuration of the producers’ context is described in relation to the development process of a proposed collaborative e-marketplace. The chapter ends with a concluding summary and theoretical reflection on the main finding of this examination which is an understanding of the collaborative settings as ‘places of collaboration’.

In chapter 5, I discuss the perspective of places of collaboration in relation to design. In particular, three aspects are discussed that are important to consider for the understanding of, and design for, collaborative settings from the perspective of places of collaboration. These aspects are also discussed in relation to the previously conceptual understanding of ‘place’ and ‘space’ within CSCW. The chapter ends with some concluding remarks in which I reflect upon the importance of understanding collaborative settings from the perspective of ‘places of collaboration’.

In the final chapter of the cover paper, chapter 6, I summarise the main conclusions from this research work and present some thoughts for future work.
Chapter 2: Methodology and strategy of inquiry

Understanding cooperative work for the purposes of design most often involves qualitative methods of collaborative settings in situ. The motivation is that to truly understand the nature and requirements of cooperative work, the study needs to take into account the situated character of work and human behaviour and action (Heath and Luff, 2000; Suchman, 1987). The most often used methodologies are ethnography, grounded theory, evaluation of systems in use and meta-analysis of other studies (Fitzpatrick, 1998). Following the general direction of CSCW research, the intention with this thesis work is to produce insights into the real-world conditions that are essential for the development of CSCW technologies and conceptually interesting for CSCW research. As a result, ethnography is considered as the most relevant methodology throughout the thesis work.

In short, an ethnographic inquiry comprises both a way of looking at a setting and a way to analyze and write about the setting. A core aim is to uncover the socially organized activities and cultures of particular settings. However, different theoretical and analytical perspectives may uncover different aspects, which means that different results of the ethnographic account are highlighted.

In the following, I will give an account of ethnography in general and outline the theoretical perspectives commonly undertaken when using an ethnographic approach. The chapter continues with an account of ethnography as used in design. Thereafter, I describe and reflect on the studies conducted in each research setting respectively. In these studies, different forms of ethnographic approach have been used due to the specific situation of each research context. The chapter concludes with a reflection on the emergence of the overall research aim and on the strategy of inquiry for this investigation.

2.1 Ethnography

The word ethnography is derived from the greek words ethnos (ἔθνος = folk/people) and graphy (γραφή = writing), and thus suggests a written account of the nature and culture of those who are studied. The tradition of ethnographic investigation was mainly developed in the human and social
science disciplines of anthropology and sociology (Button, 2000). Within anthropology, ethnography was originally developed as a way to explore small, non-western societies, making their culture and everyday realities available to others. Malinowski’s work from 1922 about the lives and culture of the people of the Trobriand Islands in New Guinea is considered as the first pioneering ethnographic study (Anderson, 1996).

Over the years, ethnographic approaches have been used within social sciences as well as in interdisciplinary fields, such as HCI and CSCW, for the study of work settings (e.g. Heath and Luff, 1992a; Hughes et al., 1992), or to examine particular activities (e.g. Turkle, 2005). Increased use of ethnography in these varied research areas have resulted in new techniques and perspectives used for ethnographic inquiry (Blomberg et al., 2002; Fitzpatrick, 1998; Randall et al., 2007). For example, a particular form of ethnographic approach emerged as an important methodology in CSCW when conducting work-place studies. These studies are concerned with the work, the interaction and technology in complex organizational settings with the purpose to inform and influence design decisions for these settings (Heath and Luff, 2000).

While different ethnographic approaches have evolved in accordance with the disciplinary fields where they have been used, Blomberg, et al. (2002) describe four basic principles that have continued to guide ethnographic practice: natural settings, holistic, descriptive, and members’ point of view. The principle of natural settings implies that an ethnographic inquiry always includes data collected in the settings where the studied activities normally occur. The motivation is that people have difficulties to express or carry out activities without immediate access to their natural setting, in particular the social and material aspects of this setting. The principle of holistic understanding implies that activities must be understood within the context in which they occur, and that an activity must be related to other activities that are also connected in time and space. The descriptive principle essentially signifies an attempt at understanding peoples’ everyday activities without evaluating the efficiency of these activities. In this respect, suggestions of changes to a setting, such as the introduction of CSCW design elements, must be based on an understanding of the setting as it is. The final principle involves gaining the members’ point of view of the setting, in other to be able to describe peoples’ concerns and perspectives. It is therefore important to describe how people categorize their world and the specific ‘language’ they
use in their setting. As a result, the terms and categories used in an ethnographical account should be those used by the people in the studied setting, and not those defined by the research community (Blomberg et al., 2002; Randall et al., 2007).

In essence, an ethnographic inquiry implies both a way of looking at a setting and a way of writing about that setting. It is thus a literary practice that results in a reportage of the setting (Anderson, 1994). It includes a commitment to understand and describe the everyday real-world experience of people in their natural setting. However, there is no single strategy of inquiry in regard to data collection and analysis. The actual data collection techniques used to carry out ethnographic studies vary. Observations and interviews are the most commonly used methods but these may be conducted in different ways and include videotaping, participant or non-participant observation, or with the help of self-reporting techniques such as diaries or visual stories etc (Blomberg et al., 2002). In addition to this, there is literary practice which implies that there is always an element of interpretation and analysis in the process of writing (Anderson, 1996). What is more, a core aim of ethnographic inquiry is to uncover the socially organized activities and cultures of particular settings. The underlying principle is to focus and show how a setting is socially organized from within the setting, including an examination of the activities in all their detail (Hughes et al., 1992). However, different theoretical and analytical perspectives may uncover different aspects and activities that compile the social organization, thus highlighting different results in the ethnographic reportage.

2.1.1 Theoretical perspectives

Ethnographic inquiry seeks explanations of social and cultural events based upon the perspectives and experiences of the people being studied. As such, an ethnographic account is grounded in the everyday lives of people and seeks to uncover the underlying coherence of their lives. However, ethnographic inquiry may also be approached from an analytic standpoint or theoretical perspective. This influences the focus of the ethnography study, the reportage and the theoretical constructs drawn from the studied setting. The most common theoretical perspectives, often used when people began to conduct CSCW studies, are symbolic interactionism and ethnomethodology. These perspectives are similar in that both are concerned with interpersonal social interaction. There, difference is in the focus of study, the analysis of
the findings and the explanation that is generated (Dourish, 2004; Fitzpatrick, 1998; Randall et al., 2007).

Symbolic interactionism is strongly associated with sociology research at the University of Chicago. The theoretical perspective and methodological position were formulated by Herbert Blumer drawing on theoretical foundations from several scholars of American pragmatism and mostly from George Herbert Mead. The use of symbolic interactionism in ethnography is mostly associated with the work of, for example, Becker, Geer, E.C Hughes and Strauss in their in-depth exploration of particular aspects of work (Dourish, 2004). Symbolic interactionism is concerned with understanding the social organisation of settings by focusing on the symbolic meanings that people attach to the situations. These meanings are seen as social products, “as creations that are formed in and through the defining activities of people as they interact” (Blumer, 1986, p. 5). The perspective is that peoples’ actions are a result of the definition and interpretation of the meaning of things. In this respect, things may be physical objects, situations or others peoples’ actions (Blumer, 1986). In the context of CSCW research, studies with this perspective have investigated interactional aspects of work in particular. Furthermore, analysis produced with the help of symbolic interactionism is often focused on extracting abstract concepts to explain the studied aspects. Star’s (1989) work and development of the concept of ‘boundary objects’ is one such example (Dourish, 2004; Fitzpatrick, 1998).

The origin of ethnomethodology is associated with the work of Harold Garfinkel (1967). In particular, the use of ethnomethodology in CSCW research emerged as a result of the work of Suchman (1987) in which the concept of situated action was coined. The aim is to uncover the nature of a setting as it is constituted by the participants. The focus is on the methods that people use to achieve social order, that is, an understanding of how people produce, recognise and co-ordinate their activities. A common technique to uncover these methods is through ‘conversational analysis’. In its most pure form, ethnomethodology generates a thoroughly descriptive account of the everyday moment-by-moment interaction and nature of the studied setting while avoiding all attempts to interpret, make abstractions, theorise or make suggestions for change of the studied setting (Dourish, 2004; Fitzpatrick, 1998; Randall et al., 2007).
These theoretical perspectives emphasize different aspects of cooperative work. However, Fitzpatrick (1998) points out that they were never developed specifically with CSCW design needs in mind, that they do not meet the needs of system designers and that they should not be expected to do so. She points out that these studies are instead useful for understanding work in its situated context, and that they are thus able to provide insights for the success or failure of design in practice. However, in her critique of these perspectives she particularly stresses the point of view of the system designer. For the purpose of design, there is a need to find metaphors and abstractions that describe what is to be designed (Fitzpatrick, 1998). In other words, a descriptive ethnomethodological study is difficult for the designer to interpret and use. In addition, symbolic interactionist studies, although capable of developing abstract concepts, tend to focus on interactional aspects of work and not on the artefacts and places that are used and evolved in the interactions and which are the focus of design activities (Fitzpatrick, 1998).

During recent years, design concerns have had an impact on the theoretical perspectives used within CSCW research. At the same time, concepts from the social understanding of work have had an impact on different design aspects. This implies an iterative process where new theoretical perspectives provide new insights that must be taken into account in the design and development of technology. From this perspective, an ethnographic inquiry is particularly suitable since different theoretical and analytical perspectives may be undertaken. In addition, an ethnographic investigation provides models for thinking about the studied settings as well as uncovering the complexities of the work that goes on in these settings. The latter includes the various ways people get the work done and the interweaving that occurs between individual and cooperative work. In this respect, ethnography has an important role in uncovering the constraints and/or opportunities faced in technology development and design. It may also help to query taken-for-granted assumptions about how cooperative work should be supported (Bannon, 1998; Dourish; 2004, 2006; Plowman et al., 1995). In addition to this, an ethnographic inquiry may generate results that are important at different levels of design inquiry, as will be described in more detail in the following.
2.2 Ethnography and design

The use of ethnographic methods intended to inform design has been a debated subject since the first CSCW studies. In an effort to move ethnography beyond the context of research, towards practical use, and appropriate the pragmatic needs inherent in the design and development of technology, Hughes et al. (1994) outline four different uses of ethnography: concurrent ethnography (figure 1), quick and dirty ethnography (figure 2), evaluative ethnography (figure 3) and re-examination of previous studies.

Concurrent ethnography in systems development is most commonly associated with long-term research and design projects. The design process is, in this case, influenced by an on-going ethnographic study. The ethnographic inquiry precedes the systems development and in an iterative process the ethnographic inquiry is sharpened as designers raise issues that need to be targeted more specifically. The results of each iteration, and the new focus of the ethnographic inquiry, are discussed in debriefing meetings. From their experience of using concurrent ethnography, Hughes et al. (1994) noted a decline in the ethnographic field work related to the particular design contribution and argued that the ‘fine-tuning’ of the system prototype needed to be informed by experts, that is, the real users in their work environment.

The use of ‘quick and dirty’ ethnography provides designers with a general sense of the setting. It is conducted through brief ethnographic studies where the ethnographic inquiry is limited due to time constraints and the attention is on specific questions that have been raised by the system developers. In this case, the project participants accept the limited understanding of the setting.

Figure 1: Concurrent Ethnography (Hughes, et al., 1994).
and are focused on aspects of work that are particularly relevant for strategic decision making (Hughes et al., 1994).

Figure 2: Quick and dirty (Hughes, et al., 1994).

An even more focused form of ‘quick and dirty’ ethnography is the use of evaluative ethnography. This form is undertaken when the design project needs to validate a set of already formulated design decisions, that is, when the project must evaluate how the current design may be amended, or inform and specify new design decision that are not restricted to the system already developed.

Figure 3: Evaluative ethnography (Hughes, et al., 1994).
The fourth use of ethnography as proposed by Hughes et al. (1994) is the re-examination of previous studies to inform initial design. In principle, a re-examination considers the general character of the social organization of the work settings and how this may inform design decisions in a variety of settings. In this way, ethnographic studies may be compared systematically to extract cross-case conclusions. Such comparison may provide awareness for designers on lessons learned and issues that may arise during the design process.

The above forms of ethnography are often cited within CSCW literature and have been described as suitable to study the pragmatic situation of commercial software projects. In this context, the problems related to limited budget, time and resources that affect traditional ethnographic study might become less important. However, Hughes et al. (1994) state that all research projects suffer these constraints. Furthermore, they suggest that the use of ethnography in systems design must be configured in relation to the circumstances of the project. This implies that these four forms must not be mistaken as fixed strategies of ethnographic inquiry.

To conclude, an ethnographic study may generate results that are important at different levels of the design inquiry. This is also noted in the present thesis, which includes studies of different settings with different research contexts. As a result, different ethnographic approaches have been undertaken due to the characteristics of each research context. In addition to this, the analysis conducted in this cover paper should also be taken into consideration. In this respect, all of the forms of ethnographic inquiry described above have been used in some way during the thesis work, and they have generated results that are important at different levels of design inquiry. The research contexts and study settings for this thesis work are described in more detail in the next section.

2.3 Research contexts and study settings

During the thesis work, four collaborative settings were studied; elderly care at home, online education, care work at a hospital clinic and the local food sector. Each setting has been studied and reported in one or two research papers respectively, all of which have been enclosed in the second part of this thesis.
My role in these studies was to understand the collaborative settings for the purposes of design. The studies focused on different aspects of collaboration and the ethnographic approach varied due to the situation of each research context. Despite the different focuses on collaboration, all studies highlight aspects relevant for the investigation and understanding of peoples’ own efforts to configure their current context for the purposes of collaboration. In the following, the respective research contexts and ethnographic approaches are described in more detail.

2.3.1 Inter-organisational elderly care at home

The studies of elderly care at home were carried out in an inter-organizational home care setting in a county in southern Sweden during 2002–2004. At the studied county, social care at home was provided by the municipalities through home help service groups, while health care at home was supplied by the county council.

The studies were part of a broader project with the general aim of supporting cooperative work in home care with the help of mobile IT tools. At that point, reports had shown that cooperation in inter-organizational settings in elderly care at home does not always function properly and information technology was often suggested as a means to improve the situation (SALAR, 2006; SOU, 2004). The problems with cooperation between the home help service and home health care were also observed by health and social care managers in the studied county and the project was therefore initiated with the idea that by supplying information through mobile technology, the problematic situation could be improved. Project participants were the county council, three different municipalities and the University of Kalmar. In the beginning of the project, an IT company also participated. This company had developed a mobile IT solution intended to support the information needs of the home help service.

As a starting point for this project, I was involved in a study that aimed to examine the work and cooperation taking place in and between the home help service and home health care. The focus was on defining problems that occurred in the daily work and on issues concerning information and communication activities. The study was conducted in two parts. First, data collection was conducted to gain as great an understanding as possible of the scrutinized setting. Second, we used this material with the purpose of defining problematic situations within elderly care at home. The results of
this study were published in a report that showed the complexity of the work and the cooperation between home health care and the home help service (Broberg and Petrakou, 2003).

The ethnographic approach that was undertaken was similar to concurrent ethnography. The aim was to provide an understanding of the work context that may be used to support design decisions and requirements elicitation for a mobile IT tool. The field work was conducted through observational studies, interviews and group discussions. A total of 30 work shifts taking place during the day, the evening and the night were observed. In addition, some 15 interviews were conducted with managers in both organisations while district nurses, assistant nurses and home help service workers participated in group discussions. These group discussions focused on four themes: problematic issues concerning the inter-organisational cooperation between the home help service and home health care, problematic issues concerning work activities, problematic issues concerning cooperative activities and finally general issues concerning information needs and tools. Parallel to this field work, we elaborated on different theoretical perspectives for analyzing the material, and some examinations were conducted and published in Broberg et al. (2003), Broberg et al. (2004a, b) and Petrakou et al. (2004a, b).

During the field work, we came across the SVOP binder, a binder that was placed in the patients’ homes. The binder contained a collection of material that the care workers themselves considered as important for supporting cooperation between all parties involved in the process of elderly care, including the patient himself/herself. It was perhaps at this point I got interested in how people themselves go about handling a complex cooperative context. For me, this interest also changed my view of the empirical material that had been collected. Instead of focusing on problems and issues typically related to the study of elderly care in a home setting, I focused on how people actually handle the circumstances of their setting, including its problems and issues. This focus resulted in paper 1 and 2 included in this thesis, where paper 1 concerns the SVOP binder and paper 2 discusses how the care workers coordinated their efforts to bridge the fact that they belonged to two separate organizations.
2.3.2 Online education in a virtual world

The second study concerned the context of online education conducted in a virtual world. The study that took place in this setting was part of a broader project called the Kamimo Project, a cooperative project involving the University of Kalmar (Sweden), Molde University College (Norway) and The University of Central Missouri (USA). During this project, several studies were conducted that focused on the opportunities and constraints of the virtual world of Second Life, including for example teaching and learning perspectives (Creelman et al., 2008; Molka-Danielsen et al., 2009).

It has long been recognized that collaborative learning is of great importance and that the aim is to design learning environments that support the students’ active involvement in the formation of their knowledge apprehension (Barab, et al., 2001; Dillenbourg, 1999; Lehtinen, et al., 1999; Slavin, 1996). Therefore, current models of online education often allow students to interact and collaborate with each other as well as with the teacher. In this respect, my role in the project was to study how the virtual world facilitates online education and to identify issues of interactivity in this context. This study is reported in the third paper included in this thesis.

Within the context of this study, I had to assume a more focused approach similar to evaluative ethnography and use it to uncover the opportunities and constraints of this virtual environment in relation to online education. The conditions of this field work created quite a special situation. The study had to be conducted within the virtual world and within the real world at the same time. In addition to this, the research process depended to a great extent on the teacher’s ability to participate in the data collection. Without this participation, it would have been difficult to gather data about the communication between teacher and students conducted before and after the sessions. In this case, the teacher had a blog where he kept a record of what happened during the course, including all contact with students.

The data were collected through a variety of methods. In order to study the virtual world sessions, I created an observation avatar and attended every Second Life session (five sessions). As a complement, virtual recordings were taken of the virtual sessions through the teacher’s computer. In order to study the real world situation, the teacher and his work place were video recorded during the sessions. Students were also asked to send in pictures of themselves taken while they attended the virtual sessions, this in order to
observe their physical study environment. Furthermore, in order to understand the situation around the course before and after each session, interviews were conducted with the teacher as well as with the students.

2.3.3 Care work following the computer-based patient record

The third studied setting concerns care work at a hospital clinic after the introduction of computer-based patient records (CBPR). The hospital clinic belonged to a county council in Sweden that was also responsible for three hospitals and several health care centres. The study I conducted was part of a broader project with the general aim to evaluate a Healthcare Information System (HIS) that had recently been implemented. Some results from the project have been published in Broberg (2008). Participants in the project were managers and administrators from the county council and researchers from the Linnaeus University. During the evaluation process, the initial research team came across the use of paper documents, and I was engaged to study the use of these documents.

The ethnographic approach that I was able to undertake was similar to *quick and dirty ethnography*. With limited time, the aim was to observe the use of the paper documents and assess if this affected the result of the overall evaluation of the HIS. For this effort, observations combined with interviews were conducted with different workers at the clinic. During the observations, the documentation flow of a patient was also followed by observing the documentation process of selected patients from the time the patient was registered in the reception to the time their patient record was documented.

An assessment of the field work showed that the paper documents did not affect the HIS evaluation or a potential re-design of the HIS. In fact, the use of paper documents seemed to complement the use of the HIS by supporting the daily work of patient visits. However, from my particular point of view based on my experience from the previous projects, these paper documents showed aspects concerning changes in the work practice that were important for CSCW research. From this perspective, I examined the field-work material and focused on the paper documents by viewing them as an important facilitator used to manage the daily work. This resulted in a manuscript included in this thesis (paper 4) aiming to identify essential aspects of work practice in this context, practice that must be taken into account for future developments of technology support.
2.3.4 A collaborative e-marketplace for local food producers

The fourth setting concerns the local food sector, studied from two perspectives and reported in paper 5 and paper 6 included in this thesis. The research context of these studies of local food producers is quite different from the contexts of the previous studies.

The starting point was the development of a collaborative e-marketplace for the local food sector. 23 local food producers were engaged to work in close cooperation in a Research & Development (R&D) project to develop such a marketplace. This R&D-project is an ongoing, three-year research project (2008-2011), supported by the Swedish Agency for Innovation Systems (VINNOVA). The overall aim of the project is to analyse, design, implement and evaluate models of sustainable digital services intended to support e-marketplaces. In addition to local food producers, the project included one wholesaler, one provisions consultant and one municipality that also performed the part of customer within the e-marketplace.

The methodology followed an iterative process similar to that used in concurrent ethnography with the aim of informing the design and development of the e-marketplace. A study with a focus on the marketing and business activities in the work of local food producers preceded the first design effort. In particular, we studied issues of interaction that are important to consider when developing a collaborative e-marketplace (as reported in paper 5). The results of this study was implemented in the first e-marketplace design, called Pilot 1. The intention with this first version of the e-marketplace was that the local food producers could use it as a basis for discussion. This discussion could then be the starting point for further development. However, while all participating local food producers considered the creation of an e-marketplace as important, it was quite difficult to engage them in the design and development process.

With this situation as a starting point, we conducted another study with a focus on the collaborative context of the local food producers and particularly on the drivers and barriers for collaboration. During this study, we found that the local food sector seemed to consist of clusters of producers. Collaboration occurred quite frequently within the clusters, but between the clusters there was a clash of identities due to divergent views and opinions, in particular of

1 VINNOVA home page: http://www.vinnova.se/en/
the definitions that should be used concerning the core business of the local food sector. Thus, we were able to identify a situation that affected the engagement in the development of a collaborative e-marketplace. The result of this second study and the implications for future development of the collaborative e-marketplace are reported in paper 6.

### 2.4 Concluding reflection

Following the endeavour of CSCW research, the intention with the present thesis work is to produce insights into real-world conditions that are essential to the development of CSCW technologies and conceptually interesting for CSCW research. In order to realize this effort, four collaborative settings have been studied through different forms of ethnographic inquiry. The settings are: elderly care at home, online education, care work at a hospital clinic and the local food sector. My role in all these studies was to understand the collaborative settings from a design perspective. In this respect, all of the conducted studies have generated results that are important at different levels of design inquiry for their respective research contexts.

While each study was initiated in different ways and conducted with different focuses on collaboration, they all demonstrate important aspects of peoples’ ability and adaptability when working together. In retrospect, this situation is a core aspect that must be taken into account also in the design of systems that support these collaborative arrangements. To explain and explore the general character of this situation, the aim of the cover paper is to explore peoples’ own efforts to configure their current context for the purposes of collaboration.

For this investigation, there is a need to systematically compare and enable synthesis to extract cross-case conclusions. Considering the need of design abstractions for CSCW research and technology development, such an investigation needs to be conducted in relation to a theoretical framework that allows for design abstractions. However, as Fitzpatrick (1998) points out, theoretical perspectives such as ethnomethodology and symbolic interactionism were never developed with the specific needs of CSCW design in mind. For the purpose of CSCW research, there is a need to find abstractions that may account for an understanding of cooperative work, guide design and support the communication gap between understanding and design (Dourish, 2004; Fitzpatrick, 1998). For this reason, the main findings
of each setting are examined and reflected upon in relation to the most current core concepts within CSCW research. Specifically, the theoretical reflection is based on the notion of ‘place’, ‘space’ and ‘boundary objects’. The motivation is that ‘place’ and ‘space’ are common abstractions used when understanding and designing for CSCW. In addition to this, there is the concept of ‘boundary objects’, which is one of the core concepts within CSCW literature. This concept was also shown to be important for understanding cooperative work in the first ethnographic study of inter-organisational elderly care at home. In the following chapter, the theoretical framework for these concepts is described in more detail.
Chapter 3: Theoretical framework

This chapter describes the framework of the concepts that are used for the exploration of peoples’ efforts to configure their current context for the purposes of collaboration. The central concepts are ‘place’, ‘space’ and ‘boundary objects’. These concepts are common abstractions used when understanding and designing for CSCW and they are applicable across a number of cooperative settings. ‘Boundary object’ is also an important concept when understanding how groups work together without having reached a consensus.

The account of these concepts and their relations is structured first through a discussion of ‘space’ and ‘place’ and how these concepts have been used within the CSCW field when understanding and designing for cooperative work. Particular focus will then be on the concept of place; its definition and its relation to other relevant concepts used within the CSCW field. The chapter continues with a discussion of the concept of ‘boundary objects’ in relation to the concept of place. I conclude this chapter with a summary and a motivation of the use of these concepts when realising the research aim.

3.1 Designing for ‘Space’ and ‘Place’

Space and place are analytical concepts used in many research areas. In particular, they are fundamental concepts in human geography, but they have also been influential in fields such as anthropology, sociology, psychology, architecture and urban planning and design (Cresswell, 2004; Gieryn, 2000; Tuan, 1977). In short, space is the three-dimensional structure of an environment, and it thus refers primarily to physical properties. Place is the cultural understanding of human behaviour and action in different spaces. It has evolved from a tension between connectedness and distinction (Dourish, 2004; Tuan, 1977).

The concepts of space and place are particularly interesting for design related areas since they are metaphors of peoples’ everyday experience – an experience that designers aim to design for. In particular, spatial metaphors were adopted in early CSCW research, and the idea of space was a fundamental aspect of how many interactive systems operate. However, an alternative view emerged arguing for the importance of understanding and
designing for ‘place’ in collaborative settings (Dourish, 2004). To make a distinction between the focus on ‘space’ and ‘place’ within the CSCW field, I use the concepts space-centric view and place-centric view.

The discussion about ’space’ and ‘place’ as a basis for CSCW design was initiated by Harrison and Dourish (1996) who explored ‘space’ as the focal point for systems design. At that time, system design often used notions of ‘space’ and spatial models to facilitate interaction in collaborative and communicative environments. The argument was that spatial models provide a natural metaphor for collaborative systems design, since the spatiality of the everyday environment is what people have in common (Dourish, 2004; Harrison and Dourish, 1996). Drawing on understandings from architecture and urban design, and on their own research findings, Harrison and Dourish (1996) argued that the behaviour and action of people are not based on the physical constraints of the spatial environment, but on social norms and a cultural understanding that help people to frame their behaviour. This implies that two settings with the same physical configuration may produce different kinds of interactions. This depends on the understood appropriate behaviour with regards to the social meaning they have been invested with. Hence, the same space may function as different places (Dourish, 2004). To clarify the distinction between space and place, Harrison and Dourish (1996, p. 67) used the phrase “Space is the opportunity. Place is the understood reality”. They further argued that it is the notion of ‘place’ that needs to be discussed and taken into account when supporting CSCW design. In the following, the space-centric view and some critique is outlined in more detail. This is followed by an account of the place-centric view within CSCW research.

3.1.1 The space-centric view and its critique

Space is the three-dimensional structure of an environment, and it is principally concerned with physical properties (Dourish, 2004). A space-centric view of understanding and designing for cooperative work is particularly visible in the design of many collaborative virtual environments (CVEs), but also in the early CSCW framework meant to categorize interaction support for collaborative settings.

A space-centric view considers the physical properties of a setting and exploits them in the design, trying to mimic the spatial organization of real-world interaction between people. This also implies a focus on how people and artefacts are configured in a setting in relation to direction and distance.
From this perspective, it is argued that by configuring space in different ways, different kinds of behaviours can be supported. With space as a metaphor, the concept of ‘shared workspaces’ has become a common feature of many collaborative tools, such as collaborative virtual environments, providing a setting for particular forms of interaction.

The space-centric view is also visible in the early CSCW framework. In this context, it was argued that the nature of cooperation can be distinguished by the way in which the group members interact, that is, synchronously (real time) or asynchronously (non-real time). Synchronous interaction requires the presence of all cooperators and allows for immediate feedback. Asynchronous interaction does not require concurrent interaction between cooperators but allows for responses according to people’s own schedules (Johansen, 1988; Rodden and Blair, 1991). In this respect, CSCW technologies were often categorised into a two dimensional matrix as described in figure 4.

![Figure 4: Matrix of the geographic and time dispersion of participants (Based on Johansen, 1988).](image)

The matrix describes four categories in which participants interact synchronously or asynchronously, while being either in the same location (co-located) or in different locations (remote). The categorization was originally introduced by Johansen (1988) and has since been adopted by many CSCW researchers. However, it seems that in spite of the different categories that support interaction, a main endeavour was to create systems that allowed for the same richness and variety as face-to-face interactions.
Hollan and Stornetta (1992) framed this endeavor as the telecommunication problem, and argued that telecommunication research is often initiated with the implicit assumption that the perfect state of “being there” is “broken” when people are not physically proximate, and that this state needs to be restored by imitating and creating a sense of “being there”. The ideal state of a system is to allow those who are physically distant the similar possibilities for social interaction as those who are physically present. Hollan and Stornetta (1992) question this ideal state by arguing that systems built with the purpose of bringing people that are physically distant closer to each other by imitating physical proximity will always keep those who are physically apart at a disadvantage. They further propose that the aim should be to develop tools that go beyond being there, i.e. tools that people prefer to use even if they have the option of interacting in physical proximity. In that case, the focus should be on: “...identifying the needs which are not ideally met in the medium of physical proximity, and evolving mechanisms which leverage the strengths of the new medium to meet those needs.” (Hollan and Stornetta, 1992, p. 125).

In a similar vein, Schmidt and Rodden (1996) discuss the fundamental conceptual problem in the ‘architecture’ of CSCW platforms based on the two dimensional matrix. They specifically argue that CSCW technologies should be categorized according to requirements and not the characteristics of the medium. The argument is drawn from a background of CSCW technology failing to meet the requirements of users in actual cooperative work settings. The main reason for these failures was the inadequate support of the seamless and complex formal and informal interactions and the interwoven individual and cooperative work that characterizes work practice (Schmidt and Rodden, 1996).

With space as a metaphor, media spaces were developed to support collaboration in work places that are physically distant through a two-dimensional transmission of video and audio (Bly et al., 1993). More specifically, there has been a need to support those aspects of social connections and interactions that have been shown as essential for work practices, such as providing awareness of each other’s activities and supporting informal interactions (Heath and Luff, 1991; 1992b). In essence, media spaces aim to extend the physical space of a work place (Bly et al., 1993; Gaver, 1992). In a study of the affordances of media spaces for
collaboration, Graver’s (1992) study showed some interesting aspects regarding the “space” that is created through these systems. In particular, the created “space” is both discontinuous and arbitrary. Video, for example, provides a restricted field of view and conveys a limited amount of information on the three-dimensional structure. Due to this, Graver (1992) states that video may hardly be conceived as a space at all since it limits peripheral vision, exploration, inspection and peripheral awareness. Most importantly, the video space does not extend continuously from the local environment to truly expand the physical space of a work place (Graver, 1992). However, the analysis also shows affordances related to asymmetrical access. This implies both positive and negative aspects. Watching or listening to people without letting them know it may be conceived of as “spying”. At the same time, this allows an unobtrusive “glance” and supports awareness without interruption. Heath and Luff (1991) report on a similar analysis of the asymmetries of media spaces. In specific, they argue that asymmetries in social interaction can facilitate, or undermine, certain collaborative tasks between users. For example, on the one hand media spaces allow participants to monitor each other’s behaviour as well as remain sensitive to their visual conducts. On the other hand, resources for conventional communication such as gestures are rendered inefficiently by the technology. As Graver (1992) points out, the ‘space’ created by media spaces is significantly different from actual physical work spaces. However, this does not mean that collaboration through media spaces is “worse” compared to the everyday world interactions. In this respect, he argues that:

“Comparisons to the everyday world are useful in emphasizing the potential richness of interactions in media spaces. But an appreciation of the everyday should not interfere with an understanding of the new affordances offered by audio-video technologies....media space technologies can potentially allow us to go “beyond being there....” (Graver, 1992, p. 23).

Beginning from the position that real-world face-to-face interaction is not always an appropriate point of comparison for new media technologies, Dourish et al. (1996) also investigate the long-term use of media spaces. Using this perspective, they found that work practices and communication practices co-evolved as the people became more familiar with the medium. They further argue for a view of media spaces that emphasizes emergent communicative practices, in contrast to evaluating them based on the transfer of face-to-face behaviours. This argument is further elaborated by Harrison
and Dourish (1996) in their distinction between ‘space’ and ‘place’ in relation to how interactive behaviour is framed. In essence, they argue that it is not the properties of space that frame behaviour, but rather a mutually held cultural understanding created by a sense of place.

3.1.2 The place-centric view and current research

Place-centric understanding and designing for cooperative work consider that in everyday experience and interaction, it is a sense of place, rather than the structure of the space, that frames the behaviour. A focus on place takes account of the different ways a space may be understood and used, how it is populated with people, practices, meanings and artefacts.

According to Dourish (2004), taking a place-centric view implies three consequences for design. First, it takes attention away from the structure of the space and instead focuses on the activities that take place there. With this as a basis, the emphasis is not how to design space, but how to design for interaction. Second, the idea of place is relative to a particular community of practice, which implies that places will be different for different communities that share the same space. Finally, place reflects the emergence of practice, that is, the knowledge that is shared by a particular set of people based on their common experiences over time. Practice emerges over time in the space but at the same time, the space is also turned toward the particular needs of the moment, and people need to customize the space to the changing needs. An important point to recognize here is that these practices emerge not from the designers of the system, but from the actions of its users. This implies that, in essence, place is a social product that cannot be designed, only designed for (Dourish, 2004). In this context, Dourish et al. (1996) argue in particular that when employing spatial models in the construction of media spaces, it is important to permit users a flexible and exploratory use of the space to allow places to emerge.

Since the debate of space and place was initiated, the interest in place as a central concept has increased. Among the first to discuss the topic was Fitzpatrick et al. (1996) in their study of a virtual work domain for system administrators. They especially suggested that the concepts of place, locale and centres take into account that people work in multiple social worlds simultaneously. Drawing on understandings of place and locale, and on findings from several of her studies, Fitzpatrick (1998) developed the locales
framework. The locales framework was presented as a bridge between understanding and designing for collaborative settings, with the help of a common abstraction that is grounded in the sociality of work. The locale framework considers the concept of ‘locale’ as the primary unit of analysis. The concept was first used by Giddens (1984) and describes the same idea as place, but focuses on the use of space to support interactional needs. For the locales framework, Fitzpatrick (1998) argued that these interactional needs frame the production, the use and transformation of the space(s) and the resources, for the experience of place.

In more recent years, the topic of place seems to have attracted significant interest. In a recent special issue of the journal of CSCW, titled “Settings for collaboration: the role of place”, the editors declare that 30 submissions was received as a result for the call for papers. They further state that the subject of space and place with its various perspectives has important significance for CSCW research (Ciolfi et al., 2008). The published papers in the special issue include conceptual explorations of the space-place distinction and empirical papers that examine how new kinds of applications support human and social activities. For example, Østerlund (2008) explores the relationship between documents and places, arguing that when work is mobile and distributed, entailing complex interdependencies, documents themselves can become critical places for coordination and communication. It should be noted, though, that the concept of place hides many differences and to truly understand place and how people create places, it is necessary to first understand people’s experiences of place.

3.2 Understanding ‘Place’ in ‘Space’

Place is the cultural understanding of behaviour and human action and is evolved from a tension between connectedness and distinction (Dourish, 2004; Tuan, 1977). The concept of place is fundamental to research in human geography, yet the word ‘place’ hides many differences since it can stand both for an object to study and a way of looking at the world; as places that are in some way separated from each other (ontology) and as a way of knowing the world (epistemology). What is more, different theories of place lead to different focuses when understanding the world. In this respect, place is not only something to be observed and researched, but is itself part of the way we see and research (Cresswell, 2004).
The role of place has been approached from different perspectives and at different levels of depth, but to really understand, define and study place, it is necessary to use it in relation to space since the two concepts depend upon each other (Creswell, 2004; Tuan, 1977). To understand place and how people create places, it is important to first understand people’s experience of place. In his studies of human experience of space and place, Tuan (1977) shows that space is experienced as “having room to move” (p. 12), and conversely place is experienced as an “enclosed and humanized space” (p. 54), “a calm center of established values” (p. 54), “an organized world of meaning” (p. 179). In this respect, Tuan argues that:

From the security and stability of place we are aware of the openness, freedom, and threat of space, and vice versa. Furthermore, if we think of space as that which allows movement, then place is pause; each pause in movement makes it possible for location to be transformed into place. (Tuan, 1977, p. 6.)

Tuan (1977) states that if the world is seen as a constantly changing process, we would not be able to develop any sense of place. An undifferentiated space becomes place as we get to know it better and give it value (Tuan, 1977). According to Gieryn (2000) places are made by people when they attribute qualities to the material and the social stuff gathered in a particular spot in universe, thus separating here and there, mine and yours, ours and theirs, safe and dangerous, rich and poor, accessible and inaccessible. When people invest meaning in a portion of space, become attached to it in some way and visit this space for particular reasons, space becomes place (Creswell, 2004; Gieryn, 2000).

As an analytic concept in Sociology, Gieryn (2000) defines place in relation to three aspects: Geographic location, Material Form and Investment with meaning and value. From this account, place is a unique spot in the universe, a space, distinguished by people who consider what is here and what is there. Places therefore have finitude, but the boundaries are elastic. Places also have physicality in that they are compiled by the objects in that particular space. Places are created by people and are thus the result of significant human effort. In addition, people invest meaning and value in places. According to Gieryn (2000) without naming, identification and representation by people, a place is not a place.
Places are created through the use of space, but spaces are part of the material. Places are a social product consisting of everyday practices. They are never finished but produced through the reiteration of practices. Place is attached to cultural meaning, it is a focal point for activities and patterns of living, and actively influences our behaviour and lived experience. Places are produced by people and constructed through human practices, and at the same time they are a core aspect of the production of relations between people and thus affect human practice (Cresswell, 2004; Gieryn, 2000; Harrison and Dourish, 1996; Tuan, 1977).

3.2.1 Place and practices

Relevant to the concept of ‘place’ is how it is related to the concepts that Lave and Wenger (1991) call ‘community of practice’ and what Strauss (1978) describes as ‘social worlds’. In addition to this, there is the concept of ‘work practice’ commonly used within CSCW research (Button and Harper, 1996).

When comparing the concepts of ‘community of practice’ and ‘social worlds’, Bowker and Star (1999) note that they are both units of analysis that refer to relations between people that share the same interest and commitment to conduct activities together. As a unit of analysis, both concepts reach beyond organizational boundaries, associations or institutions and it is essentially the activities, including their routines and exceptions, that constitute the structure of the community of practice, or the social world. Becoming a member of such a group is a complex process involving participation in activities, shared conversations, technical exercises and encounters with the objects involved in the practice such as tools, furniture, texts, and symbols. In addition, the essential condition for membership is increasing familiarity. As familiarity deepens, members forget the strange nature – as seen by outsiders – of the objects that are included in the community (Bowker and Star, 1999).

The concept of ‘work practice’ particularly concerns the ways in which people organise their work (Button and Harper, 1996). In this thesis, ‘work practice’ is more precisely defined as a set of activities, including the routines and exceptions that constitute work for a group of people. This means that work practice comprises the knowledge that the members have gained over time, through the actual conduct of work. In essence, work practice may refer to a community of practice, or a social world, but implies a focus on the
working life that people are engaged in. In this way, the boundaries of a work practice are defined according to a particular work setting.

In this respect, my understanding of the relation between ‘place’ and ‘practices’ is that places are created through the use of space by the people who constitute a community of practice, by a social world or by a work practice. A place is relative to a community and will be different for different communities as also argued by Dourish (2004). As a core aspect of the production of relations between people, places affect the work practices, the communities of practice, or the social worlds that inhabit them. In other words, and as stated previously, places are produced by people and made through human practices, and at the same time they are a core aspect of the production of relations between people, and thus affect those practices.

3.3 Boundary objects

Within CSCW research, different theoretical constructs have been used in order to further analyze and understand cooperative work. A boundary object is an analytic concept that refers to those objects which interest all of the collaborative communities consisting of practices, or of social worlds, but which also satisfy the informational requirement for each of them (Star and Griesemer, 1989). Previous work within CSCW has considered boundary objects as important aspects of communication spaces (Bannon and Bødker, 1997) and organizational memory (Lutters and Ackerman, 2007). In fact, boundary objects is a core concept within CSCW research when trying to understand how multiple groups and practices work together without consensus. However, it has been debated when an object can truly be considered as a boundary objects. For example, Lee (2007) questioned the tendency of researchers to label all artefacts that are used between groups as boundary objects.

The concept of boundary object was originally introduced by Susan Leigh Star in the AI community to help understand distributed decision making, and applied by Star and Griesemer (1989) in their analysis of scientific work. Specifically, they examined how a heterogeneous group of actors, involved in the development of a natural history research museum, managed to cooperate despite the fact that the group had divergent viewpoints. In analyzing the case study, they showed that one of the central factors contributing to the success
of the studied setting was the development of boundary objects. Boundary objects were then defined as:

“... objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites ... they have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.” (Star and Griesemer, 1989, p. 393).

Boundary objects are not merely constructs of physical material, then, but can be abstract entities such as ideas, interests, rules, conversations, plans, memories or stories. Important to note is that Star (2010) uses the term object in its material sense. This is derived from an understanding of the concept of ‘object’ as something people act towards and with, and “its materiality is derived from action, not from a sense of prefabricated stuff or “thing”-ness” (Star, 2010, p. 603). To continue, boundary objects are working arrangements, adjusted as needed and shared by different communities of practice, or social worlds, with diverse interests. Potentially conflicting sets of concerns between communities may be satisfied through the production of boundary objects (Star and Griesemer, 1989; Star 2010). More explicitly, Lee (2007) points out that shared work creates objects that inhabit multiple social worlds simultaneously. In this respect, boundary objects are viewed or used differently by the involved communities and they do not have to be fully understood by the respective parties. They rather serve as a point of reference or point of negotiation and thus play different roles in different situations. What is more, boundary objects are produced over time from robust cooperation between communities of practice, or social worlds, and cannot be defined once and for all since they are a product of negotiation and change. In this respect, multiple boundary objects and systems of boundary objects may grow to become ‘boundary infrastructures’ (Bowker and Star, 1999, Star and Griesemer, 1989; Star 2010).

The architecture of boundary objects consists of three components: interpretative flexibility, the structure of informatics and work-process needs and arrangements, and, finally, the dynamic between ill-structured and more tailored uses of the objects (Star, 2010). Interpretative flexibility implies that the boundary object is used and interpreted differently between the different
cooperating groups. The second component involves the material/organizational structure of different types of boundary objects. This component implies that boundary objects are organic infrastructures that arise based on local perceptions of information and work requirements, by groups that wish to cooperate. The third component involves the question of scale/granularity and considers the dynamic process that characterize boundary objects.

According to Star (2010), the third component is also central to the notion of boundary objects. She further explains the dynamic process as follows. First, the object resides between groups that are ill-structured. Second, when necessary, the object is worked on by local groups that allow it to retain its vague identity as a common object, while at the same time making it more specific, more tailored to local use within a social world, and therefore useful for their work. Finally, groups that cooperate without consensus tack back-and-forth between both forms of the object. Reflecting on this latter dynamic, Star (2010) points out that:

“…..when the movement between the two forms either scales up or becomes standardized, then boundary objects begin to move and change into infrastructure, into standards (particularly methodological standards), and into things and yet other processes, which have not yet been fully studied as such.” (Star, 2010, p. 605)

In the context of place and space, my understanding is that boundary objects are an important component in a space where several communities of practice, or social worlds, intersect. In other words, in a space experienced as different places by the respective community, the production of boundary objects is essential for the communities that need to work together.

3.4 Concluding summary

In this chapter I have outlined the theoretical framework surrounding the concepts that will be used for the examination of peoples’ efforts to configure their current context for the purposes of collaboration. The central concepts are ‘place’, ‘space’ and ‘boundary objects’.

To produce insights that are essential for the development of technology, as well as conceptually interesting, the current discussion within CSCW about the role and constitution of ‘place’ and ‘space’ seems highly relevant for my investigation. With the current background of ‘space’ and increasing interest
in the concepts ‘place’, the central concept in this thesis is the concept of ‘place’ in relation to ‘space’ and ‘boundary object’. What is more, all these concepts are applicable across a number of cooperative settings.

Place is a social product. Places are made by people and their practices, and at the same time those practices are affected by the places that they helped produce. As a core aspect of the production of relations between people, places affect the work practices, communities of practice, or social worlds, that inhabit them. In this respect, the concept of ‘place’, in relation to ‘space’ and ‘boundary objects’, is well suited for theoretical reflection and an examination of peoples’ efforts to configure their current context for the purposes of collaboration. In this thesis, ‘configuration’ implies the tools, rules and norms designed by the people that constitute the practice of a setting. Furthermore, ‘context’ implies the setting with its surrounding and circumstances, the setting where the people and their practices are situated.

This understanding of place suggests that the utilisation of space is essential. Practice emerges over time in space, but at the same time, space is turned towards the particular needs of the moment so that people need to customize their space to suit the changing needs. In addition to this, there is the concept ‘boundary objects’, which is a core concept when understanding how multiple groups and practices are able to collaborate without particular degrees of consensus. In relation to ‘place’ and ‘space’, my understanding is that the production of boundary objects are important in a space of intersecting communities that need to work together.

To conclude, common abstractions that are applicable across a variety of settings, such as ‘place’, ‘space’ and ‘boundary objects’, enable the systematic comparison and synthesis of cross-case conclusions. As a result, examining people’s efforts to configure their current context for the purposes of collaboration also gives conceptually interesting insights. These insights must be taken into account also when designing and developing computer-based technologies that support collaborative settings. In the following chapter, I present my theoretical reflection and examination.
Chapter 4: Findings. Places of Collaboration

In this chapter I examine and reflect upon the main findings from the studied collaborative settings: elderly care at home, online education, care work at a hospital clinic and the local food sector. Each setting has been studied and reported in one or two papers respectively, and they are enclosed in the second part of this thesis.

The foci in the papers are on different aspects of collaboration. The setting of elderly care at home is reported in paper 1 and 2. The focus of paper 1 is the use of a tool, a binder called the SVOP binder, which collects material considered as important to sustain cooperation between all parties involved in elderly home care. The focus of paper 2 is on the coordination activities that take place between two organizations that provide elderly care at home. The setting of online education in a virtual world with a focus on issues of interactivity related to the virtual world is reported in paper 3. The setting of care work after the introduction of computer-based patient records in a hospital clinic is reported in paper 4. The focus of that study is on how the daily patient visits were facilitated with a new paper-based tool, ‘the work record’. Finally, the setting of local food producers is reported in paper 5 and 6. Paper 5 focuses on issues of interaction concerning the marketing and business activities of local food producers, while paper 6 focuses on the collaborative activities between these producers. Despite the different foci on collaboration, all studies highlight aspects relevant for the investigation of people’s own efforts to configure their current context for the purposes of collaboration.

In the following, I examine and reflect on the main findings and characteristics of each setting, respectively. In specific, I first outline the circumstances surrounding the setting and thereafter describe how the people in the setting configured this context for the purposes of collaboration. Finally, I make a theoretical reflection in relation to these findings. An exception to this structure is the study of the local food sector. In the setting of local food producers, the circumstances and configuration of the producers’ context are described in relation to the development process of the proposed collaborative e-marketplace. The chapter ends with a concluding
theoretical reflection that addresses the conceptual understanding of these findings.

4.1 Integrated places for elderly care at home

The studied setting in paper 1 and 2 included two organizations that provide the elderly with care at home: social care at home was provided by the municipalities through home help service groups, while health care at home was supplied by the county council. The two papers report on this setting and they show two issues that relate to circumstances of inter-organisational cooperation. In addition to this, they also reveal how the care workers configured this context in order to provide integrated elderly care at home.

The first issue, mainly discussed in paper 1, concerns the fact that elderly care at home is a complex setting for cooperation, creating a need for care workers to cooperate within their own group, within their own organisation between work shifts and also across organisations. The second issue is mainly discussed in paper 2 and concerns the challenges that arise when elderly care at home is provided by two organisations with different responsibilities. In specific, paper 2 shows how the responsibility and division of some care interventions are debated during the planning of the home care process, during the care plan meeting. This is particularly obvious when looking at care interventions that are defined as ‘self-treatment’, since the two organizations have different views about what may be defined as ‘self-treatment’. At the same time, the core aim in the studied setting is to provide the care receiver with good-quality care, and the actors need to coordinate their efforts regardless of their organisational belonging to achieve this aim.

With the above context in mind, the care workers created additional tools and routines to support cooperation and coordination that went beyond the organisational boundaries of the workplace. One of the most important findings (Paper 1) is the tool that the care workers created to facilitate their collaboration, that is, a binder called the SVOP binder. Furthermore, the findings (Paper 2) also show that sometimes the care workers conducted care interventions that went beyond those agreed upon during the care plan meeting, such as the issue of self-treatment.
With a focus on the SVOP binder (Paper 1), the findings show how coordination and cooperation were facilitated in the studied setting. The SVOP binder was considered the care receiver’s property and it was used for storing, documenting and communicating information about the care receiver and his/her care process. The binder was placed in the care receiver’s home and collected two types of material: material that used to be kept separately by the two organisations and material needed to support cooperation. The binder consisted of several documents that provided the workers with information for administering home care interventions and for supporting cooperation and coordination between the workers involved. By integrating information, the SVOP binder supported care personnel with an awareness of the other care providers; it described the activities that had been conducted, and it outlined the events that may have occurred during the home care process. Without the binder, some of this information would not have been known to co-workers from other groups within and across the organisations. However, the SVOP binder was not only a collection of information; it also helped to support the informal information needed in the daily work of the care service.

A particularly interesting aspect of the SVOP binder, relevant for understanding the care workers configuration of their current context, is that the SVOP binder supported a patient-centric view of care. In this respect, the main intentions with the binder were to share information, to enable care providers to communicate with each other about the care receiver and also to include the care receiver and the relatives in the care process. For the latter intention, the SVOP binder made it possible for relatives and the care receiver himself/herself to actively participate in the care process. Therefore, the binder was able to reflect the views of both formal and informal care providers as well as the views of the care receiver. It is important to note that the binder was always with the care receiver since it was placed at home and followed the care receiver to hospital and to visits to primary care, thus providing information to other actors involved in the chain of care.

The binder was designed to meet the demands of the complexity of elderly care at home and the material collected in the binder was carefully considered by workers and managers in the home help service and home health care. The care workers’ holistic understanding of the elderly care process is one of the cornerstones of the SVOP binder. At the same time, the SVOP binder suffered from some problems. In particular, the placement of the binder in the
care receiver’s home meant that the material was not accessible to the mobile care workers at all times, and thus failed to fully serve the need for effective dissemination of information and coordination during the home care process. While effective dissemination of information is discussed in both papers primarily as a technical issue, the challenges with distributed coordination are further discussed in paper 2.

With a focus on the coordination activities (Paper 2), the findings show that coordination is especially challenging between time shifts. In fact, collaborating between time shifts within an organisation was shown to be more difficult than collaboration between organisations. The reason is that day-shift workers, regardless of organisational belonging, tried to reach each other by phone when they knew that the information must be disseminated before a home visit. As a result, if they forgot to note the same information in the SVOP binder, the night-shift personnel may have lacked this information. This implies that while the SVOP binder was initially constructed to support inter-organisational cooperation and coordination, the findings in paper 2 show that the SVOP binder was equally important for the intra-organisational cooperation between time-shifts. At the same time, the communication and information dissemination conducted between day-shift personnel, due to the drawbacks with the SVOP binder, seem to have contributed in a behaviour that went beyond organisational boundaries, and also beyond the fact that the care workers wanted “to get the work done”. The fact that the care workers bended the rules in the best interest of the care receiver, and actually conducted care interventions beyond those agreed upon by the care plan meeting, shows a behaviour that does not really coincide with a view of this setting as consisting of multiple groups separated by diverse interests and goals.

Reflecting upon these findings may help to explain some aspects of the studied setting. At first view, it would seem obvious to make a demarcation between the groups of social care and health care as two distinct practices with different views of home care. Consequently, we would expect the two groups to create two different places within home care. However, this demarcation does not describe the actual behavioural patterns of this setting. In reality, cooperation between the time-shifts within one of the organisations was shown to be more difficult than between organisations. This resulted in the fact that care workers actually conducted care interventions beyond those agreed upon during the care plan meeting.
As already noted in paper 1, by providing a patient-centric view of care, the SVOP binder served as a boundary object for the heterogeneous network of actors involved in the home care process. The SVOP binder was a common object, used differently by the different groups involved. Furthermore, the SVOP binder was viewed and used differently by the respective parties and served as a point of reference as it provided all the involved actors with a joint information material and enabled communication. However, as a boundary object, the SVOP binder seems to have contributed to a place-making process in which the care workers evolved a behaviour based on how to best cooperate with each other to provide the elderly with good-quality care at home. In their context, the care workers created a sense of integrated elderly care at home. From a conceptual understanding, it seems that the SVOP binder, while initially serving as a boundary object for two practices wanting to cooperate, evolved into a practice intended to manage this collaboration, and thus, integrated two ‘places’ to one ‘place of collaboration’.

4.2 Making space into place with and within a virtual world

The actual use of a 3D virtual world as a context for online education, and how it facilitated teacher–student as well as student–student interaction, is studied and reported in paper 3. The paper shows issues regarding the circumstances surrounding the setting, but also reveals how the teacher and students configured their current context in order to facilitate collaboration.

Compared to traditional, two-dimensional web environments, a 3D environment, such as a virtual world, adds a spatial dimension. In this environment, the users are visually represented as avatars that are able to move around. For the purpose of this thesis, the study is of particular interest due to the fact that a 3D virtual world is probably the most obvious example of an interactive environment created with space as metaphor. That is, the (metaphorical) physical properties of a setting are exploited in the design. This design tries to mimic the spatial organization of real-world interaction between people. In fact, the virtual campus was designed as an imitation of the spatial organization of a real campus. For example, lectures were given in a lecture hall that was similar to a “‘real world” classroom. As in a traditional lecture hall, the teacher’s avatar was standing in front of the student avatars.
who were sitting down. In contrast to a real world classroom, the “real” students were in fact distributed in different geographical locations while their avatars where situated in the same lecture hall. The virtual world included not only the virtual campus, but also a diversity of activities, experiences and interactions that were a part of the virtual world. Furthermore, the virtual world allowed synchronous communication in combination with the 3D spatial dimension. However, even if the virtual world imitated the spatial organisation of a real world, its use created quite a special situation for the teacher and students that took part in the online education.

Firstly, the virtual world may have been a new environment for the students, which means that they had to be introduced to a new world with new social norms and rules, new navigation skills and new means of interaction. Secondly, studying a course in this environment is to enter a mix of a real-world campus situation where students meet fellow students (almost) face-to-face, and traditional online education during which students sit at home and conduct group assignments across the distance barrier. In the studied case, two additional aspects are interesting regarding the circumstances surrounding the setting. First, the students that were enrolled in the course did not know each other very well. Second, the students had different experiences of using and being in a virtual world. While some were quite experienced, others navigated a virtual world for the first time.

One particularly interesting finding was that since using the virtual world was quite a new experience for most of the students, the socialisation activities during the first two meetings centred on how to use the virtual world, and in particular on how to utilise the spatial dimension of the virtual world. The discussion between the students concerned questions related to how to walk, talk, run, fly, and which places to visit in the virtual world. In this respect, the experience of being in a virtual world became the focus of discussion, which in turn contributed to the students getting to know each other better.

During the study, the technical challenges related to the use of the virtual world became obvious. In some cases, it seemed that the students lacked the skills needed to use the virtual world efficiently. In particular, it seemed to be difficulties to utilise voice communication. This was because in the virtual world, volume is not related to the distance in the same way as in the real world. In the beginning, some situations made spoken communication quite
challenging for the teacher as everybody talked at the same time. It was
difficult to distinguish who was speaking and it was also difficult to find a
reasonably quiet place for discussions. In this respect, the findings showed
that in the beginning the students relied on their concept of real-world
conditions also in the virtual environment. Later on, when the students were
better acquainted with the virtual world and had established norms and rules
for social interaction, they started to interact with each other through avatars,
and thus started to focus on the actual course and course content. In addition
to this, when they had established a norm for social interaction, the students
used communication means outside the virtual world, such as e-mail, for
supporting their coordination of group meetings and assignments. In this
way, the students configured their current context by making use of more
suitable communication means than those provided by the assigned virtual
environment.

When reflecting upon these findings, three aspects are important to highlight
from this study, in particular from the students’ perspective. These aspects
include the role of the virtual world as a new environment for the students,
the role of the virtual world when the students became acquainted with the
environment, and the configuration of communications means to support the
student group work during the course. With regard to these aspects, the
setting shows a change of behaviour in the duration of the course.

First, it seemed that for the students the virtual world as a new environment
was experienced as a space rather than as a place. Since many of the students
visited the virtual world for the first time, the virtual world was a space in the
sense that the students had not evolved any practice related to how to use and
behave in the space. In addition to this, they did not know each other very
well, implying that the group of students had not established relations as a
community of practice, or as a social world. They shared the same interest in
attending the course, but had not established any structure for the community
such as activities, routines and shared knowledge. An important part was
therefore the social activities and the social interaction that were conducted in
the beginning of the course. Interestingly, the virtual world per se was located
at the core of the social activities, and the experience of being inside and
handling a virtual world was the focus of discussion. This, in turn,
contributed to the students getting to know each other better.
Second, when the students became acquainted with the environment and had established a community with norms and rules for how to behave within the virtual world, the role of the virtual world changed. More focus was on the actual course content and the virtual world became a place in which the lectures were conducted. In this respect, the virtual world transformed from space into place during the course due to the social activities. This transformation was related to how the students handled and acted in the new environment.

Considering the distinction between space and place, space becomes place when people invest meaning in a portion of space, that is when they become attached to it in some way and when they go to the space for some particular purpose or function. From this perspective, the configuration of communication means to support the student group work during the course shows another dynamic of place. This dynamic suggests that the students not only created a place out of the virtual world, but that this place involved the space outside the virtual world. In fact, the studied case shows a dynamic progression, which is a core aspect of ‘place’. This dynamic progression refers to the understanding that places are created by the people who inhabit them, and that these places also influence the production of relations between people and their practices: Practice emerges over time in the space and, at the same time, the space is turned toward the particular needs of the moment.

To summarise, the use of the virtual world per se constituted a collaborative learning activity that contributed to socialisation and social interaction between students. Through exploring the virtual world and getting to know each other, the students became a community. This, in turn, contributed to a configuration of the context that included communication means also outside the assigned learning environment. Considering the distinction between space and place, the virtual world per se changed from a space to a place and as such also contributed to the creation of the students as a group and a practice, allowing the students to later configure the context of collaboration and evolve the place. In a dynamic fashion, the students made space into place, with and within a virtual world.

4.3 Re-configurations in place

The setting of care work at a hospital clinic after the introduction of computer-based patient records is studied and reported in paper 4. This paper
also shows how the people in this setting configured their current context for the purposes of collaboration. In particular, the paper shows that the care workers responded to changes in their work context by re-configuring the previously used paper-based patient record to better suit their new work practice. As a result, they also re-configured their work context.

The circumstances surrounding this setting particularly involved the implementation of a Healthcare Information System (HIS). The HIS supported several work activities related to healthcare information administration. It included functionalities such as time booking and patient visit registration, handling referrals and answers, drug prescription and medication list. A central feature was the inclusion and use of the patient record in the HIS, here referred to as the computer-based patient record (CBPR).

To handle the work and coordination of the daily patient visits at the clinic following the introduction of computer-based patient records, the workers had created a new paper-based tool: two papers of A4 size that were coloured yellow and blue. Collectively, these two papers are here referred to as the work record. The two papers that jointly constituted the work record were both clinician-centric in the sense that the information provided and noted in these documents was only inserted and updated by the clinicians and not by the patients, as opposed to more patient-centric tools, such as the SVOP binder used in the context of elderly care at home. The work record was introduced to manage two aspects. First, it was used to coordinate the daily patient visits. This had an effect on how the work record was handled in terms of placement and transportation, during the practical delivery of care in the course of a patient visit. Depending on if the patients were scheduled to visit a doctor, or a nurse or both, the work record was placed and used differently. Second, the work record was used in order to support the work with patient examination since it provided an overview of clinician-centric relevant information and allowed for provisional documentation needed before the formal documentation in the patient record. In essence, it seems that the paper-based work record was important to cope with the daily work that was not supported through the computer-based patient record.

Through focusing on the work record and its use in paper 4, important aspects in the new work practice are identified, and the effects of introducing CBPR are made visible. These aspects include mobility and spatiality as
essential for work and coordination, and the parallel use of two records to support different work activities.

The first aspect illustrated by the findings in paper 4 is that work and coordination are characterised by mobility and spatiality. Spatiality is defined as the occupation and utilisation of space, while mobility is defined as the quality of movement. Together these two characteristics involve the movement of people, artefacts and resources in the work space, and the studied setting suggests that people through mobility make use of the work space in which the work is conducted. The use of the work record shows that care workers use the work space for creating and maintaining awareness of the work activities, and to facilitate coordination. To do so, they utilize the mobility of the work record by placing documents in appointed locations in the work space, and thus visually making it apparent to other care givers that it is their turn to attend to the care receiver. At the same time, the care workers allow themselves to simply monitor if the work record is placed at the appointed positions in the work space.

The second aspect is that the context of this specific care work currently includes the parallel use of two kinds of records, the computer-based patient record and the paper-based work record. In principal, the work record may be seen as a re-configuration of the previously used paper-based patient record. The work record facilitates more informal and provisional documentation. This supports the need to negotiate the medical information before publishing the formal documentation in the patient record. Furthermore, the work record is used in the medical examination, thus supporting the need for physical orientation towards the patient and not towards the computer. In this respect, the work record consists of some of those affordances that were previously available through the paper-based patient record. At the same time, the care workers make use of the many benefits of CBPR, such as better readability, availability and data quality, when reviewing patient health care information. Most importantly, the CBPR supports the information dissemination between clinics and health care centres in the county council, which may facilitate cooperation between these organisational units. In this case, the existence of two different records is valuable since the records provide different functionalities that both support the work.

When reflecting upon these findings, two aspects concerning changes in ‘place’ are identified: re-configurations of space and, as a result, a re-
configuration of the ‘place’. When technology is introduced in a ‘place’, it essentially constitutes a new space for the people and practices that make up the place. Practice emerges over time in space, but at the same time, space is also turned towards the particular needs of the moment, so that people need to customize the space to their changing needs. The creation of the work record in the studied case reflects how the care workers customized the space to their changing needs. In addition, they evolved their practice based on how to best manage their collaboration according to the new circumstances. This was based on the care workers’ common experience, knowledge, shared understanding and collective learning over time. Thus, as a result of this re-configured space, the workers have re-configured their place to support their own collaboration.

4.4 Collaborative e-market without place

The starting points for the studies of the local food sector were the development of a collaborative e-marketplace, and the group of 23 local food producers that were engaged to work in close cooperation in the design-oriented project. However, while all participating local food producers considered the creation of an e-marketplace as important for their situation, it was quite difficult to engage them in the design and development process, with the result that the e-marketplace was merely a space where no activity or interaction took place.

The initial design of the collaborative e-marketplace was based on a study as reported in paper 5. The aim was to examine the marketing and business activities of the local producers and to identify issues of interaction that were crucial to consider also when designing and developing a collaborative e-marketplace for this context. The study showed a difficult situation for the producers as businessmen, a situation in which they strived to survive and in some cases also expand. An important activity in their work was to search for new customers to make business with, but they also looked for other producers to collaborate with. At the time, the producers could find contacts by joining associations and participating in markets. However, it seemed difficult to get an overview of the surrounding fellow local food producers and to initiate collaborative activities with other producers as well as with customers in the supply chain. Looking at this situation, it seemed reasonable to expect that the producers could be supported by the visibility and common marketing forum provided by an e-marketplace. Furthermore, the e-
marketplace could be a forum for producers to find other producers, allowing them to make contact and initiate collaborative activities. As such, the e-marketplace could be viewed as a community that could be joined, an alliance able to facilitate and enhance collaborative activities, and encourage the emergence of new collaborative activities.

The findings reported in paper 5 also suggest important issues of interaction that need to be considered in the development of the e-marketplace. For example, storytelling is an important marketing strategy that needs to be encouraged. At present, personal face-to-face contacts are essential for the storytelling process that is vital when establishing a personal relationship with customers. The paper also suggests that the e-marketplace should allow for more flexibility regarding time and location when making contacts and to give the producers more control over their situation. Finally, social interaction needs to be supported to enhance the possibility of establishing and maintaining business networks and meet collaborative partners.

With the findings presented in paper 5 as a basis, the main issue seemed to be the distance barrier between producers. Therefore, the first pilot (Pilot I) of the e-market was based on the interactions taking place in a real-world market. The e-market was designed to provide an overview of the producers and their products and included functions for communication and discussion. Just as a copy of the real world market, the e-market was built on the idea that each market participant has his or her own market stand. It was also assumed that this stand should be designed by the individual producer. Thus, each producer should insert relevant information about their company and the products they wanted to make visible on the market stand. However, the Pilot I e-market was not used by the producers. Even though the e-market was available to the public and thus functioned as an additional marketing channel, the producers did not log in to the e-market to insert information about their business.

With this situation as a basis, a second study was conducted that focused on the collaborative activities taking place between local food producers. This situation was studied and reported in paper 6. In specific, paper 6 focuses on identifying the drivers and barriers to support the design and maintenance of a trustworthy collaboration e-marketplace in the context of collaboration between local food producers. The most important finding of this study was that the local food sector seemed to consist of clusters. Collaboration
occurred quite tightly within the clusters, but between the clusters there was a clash of identities characterized by divergent views and opinions. In particular, the definitions used concerning the core business of the local food sector diverged. For example, producers had different views on what may actually be considered as locally produced food, what may be defined as a quality product, what is considered “real” and “authentic” and, not least, what is an additive and what is not. Due to the diverse definitions, the producers looked to collaborate primarily with like-minded producers. This was especially true when collaboration concerned the core business. Collaboration was in some cases possible despite the clashes and the tendency to cluster. In particular, collaboration that involved add-on businesses still took place. At the same time, the configuration of the current context for collaboration regarding add-on businesses seemed to be based on friendship rather than business motivation. All in all, the configuration of the current context for collaboration between local food producers showed a situation that could not be entirely supported by a collaborative e-marketplace as this was initially planned.

Considering the distinction between space and place, the idea and design of Pilot I was built with a space-centric view and ‘space’ as a metaphor. Specifically, it imitated the spatial features of a real-world market with the purpose to support collaboration and interaction between the producers beyond the distance barrier. Furthermore, it is quite obvious that the e-marketplace was not considered as a place by the local food producers. In essence, the development process resulted in a collaborative e-market without a sense of place.

The context of local food producers reveals a setting that is viewed differently by the producers due to the diverse definitions of the concepts that define the core businesses. While the term locally is based on a metaphor that refers to geographical location, paradoxically the places created by the food producers do not coincide with these producer’s geographical locations. From the outset, it would seem easier for those producers that are near to each other to collaborate. However, identity and personal motivation factors such as friendship and core-business concepts may well be even more important for the local food producers. As a result, the producers collaborate only with like-minded producers, thus creating clusters of places with a shared understanding and common language within the clusters. At the same time, there is a clash of identities between the clusters.
Considering the current context, the initial idea and development process of the collaborative e-marketplace for diverse actors in the local food sector may be questioned. In particular, it is important to decide if the e-market should be created for the current clustered places of collaboration, or if it should be created for a place of collaboration beyond the clusters. In the latter case, a comparison may be made with the findings of the context of elderly care at home. In that study, the development and use of the SVOP binder initially functioned as a boundary object for a heterogeneous network of actors, but later seemed to have helped integrate the ‘places’ to a ‘place of collaboration’. With this comparison in mind, it is crucial to understand how the collaborative e-marketplace may function as a boundary object. However, it is important to note that the care worker were interdependent of each other’s work. The home care workers needed to create the SVOP binder to ‘get the work done’. In the context of local food production, it is then perhaps more important to first establish to what extent the producers are mutually-dependent in the creation of an e-market.

4.5 Concluding reflection

The conducted studies show different situations relevant for the investigation of people’s own efforts to configure their current context for the purposes of collaboration. In addition, through the theoretical reflection, these studies reveal that people’s efforts to configure the current context create and reflect a ‘place of collaboration’.

In the study of elderly care at home, the situation concerned two practices that wanted to cooperate and coordinate their activities to help support their own work and to provide elderly care at home with good quality. To do so, they created a tool, a binder that was placed in the centre of the cooperative work, that is, at the patients’ home. In this respect, the binder was also placed in the centre of the care chain and thus included all actors that were involved in the care chain. While the tool initially served as a boundary object for two practices wanting to cooperate, its use evolved into a practice on how to manage this collaboration. Thus, the care workers created a sense of integrated elderly care at home in their context. From a conceptual understanding, the care workers’ use of the SVOP binder integrated two ‘places’ to one ‘place of collaboration’.
In the study of online education through a virtual world, the situation consisted of a setting in which a new space was introduced for actors. In addition to this, the actors had not evolved a practice for how to interact with each other within or outside the virtual world. Interestingly, the study showed a change of behaviour during the course. The virtual world per se changed from a space to a place and thus contributed to the creation of the students as a group. The study also shows the formation of a practice that later configured the context of collaboration and evolved the place. In a dynamic fashion, the students made space into place, with and within the virtual world, and evolved a practice that helped them manage their collaboration.

In the study of care work following the introduction of CBPR, this computerized support changed an already existing space, a space that was in fact a place for the established practice. The CBPR supported the information dissemination between clinics and health care centres in the county council, and may thus have facilitated cooperation between these organisational units. However, the actors at the clinic re-configured their new space based on their knowledge and shared understanding of how individual and cooperative work was actually conducted within the clinic. As a result of this re-configured space, the workers also re-configured their place to support their own collaboration. This re-configured place included an evolved practice on how to manage collaboration based on the new circumstances.

Finally, the development of a collaborative e-marketplace for local food producers shows the relationship between a setting of established places and the design issues related to these places. In particular, the configured context of collaboration between the local food producers contained clusters of places that sometimes clashed. Due to the initial lack of understanding of this context, the development process resulted in a collaborative e-market without place. For future development and by comparing this situation with the context of elderly care at home, a relevant point is to understand how the e-market may function as a boundary object for the integration of places to a place of collaboration beyond clusters. In this case, it is perhaps more important to first establish to what extent the producers are mutually dependent in the creation of an e-market. Without this interdependency established, it seems difficult to evolve a practice on how to manage collaboration beyond the clusters.
In essence, these findings show that people’s efforts to configure the current context create and reflect a ‘place of collaboration’. A place of collaboration is made by people with the purpose to collaborate and who evolve a practice on how to manage this collaboration. To acquire a more generic conceptual understanding of these findings, there are three aspects that are important to discuss:

- how configurations reflect a place of collaboration;
- the ability of boundary objects to evolve into a place of collaboration for several practices;
- the dynamics of places of collaboration in relation to changes in peoples’ collaborative context.

To conclude, the studies show four kinds of settings and situations which all highlight important aspects of people’s own efforts to configure the current context for the purposes of collaboration. Reflecting upon these findings conceptually also gives important insights into the understanding of ‘place’. Specifically, this thesis shows how people’s own configuration creates and reflects a ‘place of collaboration’. In the following chapter, I discuss the three above aspects in an effort to better understand how to design for ‘Places of collaboration’.
Chapter 5: Discussion. 
Design for Places of Collaboration

The findings show that people’s own efforts to configure the current context is what creates a ‘place of collaboration’. A place of collaboration is made by people who want to collaborate and who evolve a practice that allows them to manage this collaboration. The studies discussed in the thesis show four different cases of “places of collaboration”.

The study of elderly care at home shows how the care workers created a boundary object to facilitate collaboration in a space of intersecting practices. The study also shows that the use of the boundary object has integrated two places into one place of collaboration. The study of online education shows the creation of a place of collaboration. This creation was related to the emergence of practice intimately connected to the understanding and use of space. The study of care work shows how a place of collaboration is affected and, in turn, produces changes. Finally, the study of local food producers shows that the producers’ current configuration consists of clusters of places of collaboration that sometimes experience clashes.

For ‘places of collaboration’, there are three aspects that need to be discussed. The first aspect regards how configurations reflect a place of collaboration. In particular, I argue that the work and the effort people put in to configure the

In the following, these three aspects are elaborated in more detail. Thereafter, I discuss the perspective of places of collaboration in relation to the current conceptual understanding of ‘place’ and ‘space’ as used within CSCW. The chapter ends with concluding remarks in which I reflect upon the importance of understanding and designing for ‘places of collaboration’.

5.1 Configurations reflect place
The first aspect is how configurations reflect a place of collaboration. In particular, I argue that the work and the effort people put in to configure the
context result in a practice with a shared understanding of how to cooperate. All four studies show findings that relate to this discussion.

Firstly, in the study of elderly care at home it was shown that defining the groups involved in social care and health care as conducting two distinct practices characterized by different views on home care does not describe the actual collaborative behaviour in this setting. The study showed a configured context in which the care workers had evolved a practice that allowed them to cooperate with each other to provide the elderly with good-quality care at home. An important facilitator for this collaborative practice was the creation and use of the SVOP binder.

Secondly, the study of online education through a virtual world showed a setting in which a new space was introduced to actors who had not previously evolved a joint practice for how to interact with each other within and outside the virtual world. However, the findings show a change of behaviour during the course. In particular, the virtual world per se changed from a space to a place through collaborative learning that allowed the students to understand how to navigate the virtual world. In turn, this process contributed to the creation of the students as a group and produced a practice that later configured the context of collaboration. They developed a place of collaboration that defined how to act and interact both within and outside the virtual world.

Thirdly, in the study of care work after the introduction of the CBPR, the care workers re-configured their new context through the creation and use of a new paper-based record, the work record. This re-configuration was based on the care workers’s common experience, knowledge and collective understanding of how individual and cooperative work is actually conducted, and the care workers thus re-configured the space to the changed needs.

Finally, in the study of the local food setting the collaborative behaviour was shown to be related to factors such as identity and definitions of core business concepts, but unrelated to the geographical distance between companies or business motivations. As a result, the current configured context of collaboration between the local food producers contains clusters of places of collaboration that sometimes clash. Due to the initial lack of understanding of this context, the development process resulted in a collaborative e-market without activities or interactions.
The studied settings are configured differently, but they all show that the work and effort to configure the context result in a practice with a shared understanding of how to cooperate: a collaborative practice which constitutes a ‘place of collaboration’. One important feature of these configurations is how people in a setting of intersecting practices and places are able to cooperate. This is further explained and understood through the concept of boundary objects.

5.2 Boundary objects integrate places

The second aspect is the ability of boundary objects to evolve into a place of collaboration. In particular, I argue that the creation, formation and utilization of boundary objects serve as a mediator in a place-making process towards a place of collaboration. This is true for settings in which several practices intersect without a particular degree of consensus but where there is a need to cooperate to get the work done. For this discussion, the findings from the study of elderly care at home are essential.

In the setting of elderly care at home, the situation preceding the creation of the SVOP binder comprised two practices where it was essential to cooperate and coordinate activities to support the work, and to provide good-quality elderly care at home. To do so, the people in charge of these practices created the SVOP binder and placed it in the centre of the collaborative setting, that is, at the patients’ homes. In this respect, the binder is also placed in the centre of the care chain, thus including all actors that are involved in the care process, including the patient and his/her relatives. From a pragmatic perspective, the care workers have created a sense of integrated elderly care at home. From a conceptual perspective, while the SVOP binder initially served as a boundary object for two practices wanting to cooperate, its use evolved into a practice that concerned the management of this collaboration. As a result, the creation and use of the SVOP binder integrated a space consisting of two ‘places’ to one ‘place of collaboration’.

Boundary objects is a core concept within CSCW research when understanding how multiple groups and practices work together without consensus. In the study of inter-organisational elderly care at home, the creation, formation and utilization of a boundary object also created a practice of how to cooperate. In particular, the boundary object served as a mediator in a place-making process that resulted in a place of collaboration.
As a mediator, the boundary object evolved and this shows the dynamic process of boundary objects as also argued by Star (2010). Boundary objects initially reside between ill-structured groups, but when they become standardized, they move and change into infrastructure, into particularly methodological standards, and into other processes, all of which, according to Star (2010), have not yet been fully studied. In the context of elderly care at home, the boundary object evolved, became standardized and changed into an infrastructure, into a ‘place of collaboration’. Thus, it consists of a practice and of an implied understanding of how to cooperate.

Relevant for this discussion is also the setting of the local food sector and the development of a collaborative e-marketplace. Due to the initial lack of understanding of this context, the development process resulted in a collaborative e-market without activities or interactions. When comparing this situation with the context of elderly care at home, it becomes possible to understand how the e-market may function as a boundary object for the integration of different places into one place of collaboration beyond the current clusters. In this respect, an important aspect to consider is the extent of interdependency in work.

In the case of elderly care at home, the care workers were interdependent of each other’s work. The home care workers needed to create the SVOP binder to ‘get the work done’. In the context of local food, it is perhaps more important to first establish to what extent the producers are mutually-dependent in the creation of an e-market. Boundary objects can only be created by groups of practices due to the interdependency in work. Only with this interdependency can a practice of how to manage collaboration beyond clusters and between practices evolve.

5.3 Re-configurations of space and place

The third aspect is the dynamics of a place of collaboration in relation to changes in people’s collaborative context. In particular, I argue that changes, such as the introduction of new technology, lead to re-configurations of space and place due to the creation of a ‘place of collaboration’. For this discussion, the findings in the study of care work after the introduction of computer-based paper records (CBPR) are essential.
In the study of care work, the introduction of CBPR changed the space in which a place was constituted. However, the care workers re-configured their new context through the creation and use of a new paper-based record, the work record. This work record may also be seen as a re-configuration of the previously used paper-based patient record, supporting those aspects of work that are not supported through the CBPR. This re-configuration is based on the care workers’ common experience, knowledge and collective understanding of how individual and cooperative work is actually conducted, and the care workers have thus re-configured the space to suit the changed needs. As a result, the workers also re-configured their place to support their own collaboration. This place includes an evolved practice of how to manage collaboration based on the new circumstances.

To conclude, a ‘place of collaboration’ is made by people who want to collaborate and who evolve a practice of how to manage this collaboration. This practice emerges over time in a particular space and at the same time this space is customized and configured to the changing needs of cooperative work. The ‘place of collaboration’ will both produce and influence external and internal changes, such as the introduction of computer-based tools. Therefore, peoples’ configurations need to be taken into account also in the process of designing computer-based tools that support these settings.

5.4 Synthesis: putting space back in place

Understanding the nature and requirements of collaborative settings as ‘places of collaboration’, gives important insights applicable to the process of design. For this discussion, I want to refer to the current conceptual understanding of ‘space’ and ‘place’ as used within CSCW and in particular to Dourish’s (2004) discussion of the place-centric view for design as described in the theoretical framework. According to Dourish (2004), a place-centric view implies three consequences for design.

First, it takes the attention away from the structure of the space and instead places it on the activities that take place there. Therefore, the emphasis is not to design for space, but to design for interaction. However, with a perspective of place of collaboration, a crucial aspect is also people’s own configurations of the collaborative context. Paradoxically, these configurations turn the attention back to space, or, more precisely, towards how the people in a collaborative context have configured and utilized space for the purposes of
collaboration. In fact, the configuration of space and the use of materiality in space is an important aspect of the creation of place. This was shown both in the study of elderly care at home as well as in the study of care work at a hospital clinic.

Second, an idea of ‘place’ is relative to a particular community of practice, implying that places will be different for different communities in the same setting. However, with a perspective of place of collaboration it is important also to consider the use of boundary objects in settings where practices and places that need to cooperate without a particular degree of consensus intersect. During configuration in such settings, the creation of boundary objects is an important part since they serve as mediators in a place-making process for the integration of places into a place of collaboration that allow communities to cooperate.

Finally, ‘place’ reflects the emergence of practice, that is, the knowledge that is shared by a particular set of people based on their common experiences over time. In this respect, a place of collaboration reflects an emergence of yet another practice, that is, a practice characterized by understanding and knowledge about how to handle and manage collaboration in a setting. This practice emerges over time in a space and, at the same time, this space is customized and configured to suit the changing needs of cooperative work conducted within this space. In this respect, it is important to consider that changes, such as the introduction of computer-based tools, affect the ‘place of collaboration’ and that this in turn will re-configure the collaborative practice.

To conclude, the perspective of ‘places of collaboration’ highlights in several ways people’s own efforts made for the purposes of collaboration. My main argument is that people’s own configurations of their collaborative context create a practice of how to cooperate and thus reflect a ‘place of collaboration’. In essence, a ‘place of collaboration’ is a social product that cannot be designed, only designed for. However, to truly understand a ‘place of collaboration’, an essential aspect is to consider configurations in space. In relation to the discussions within CSCW about designing for space or place, I argue for a synthesis in which understanding ‘space’ and ‘place’ are equally important. Drawing on my understandings of ‘places of collaboration’, it is time to put ‘space’ back in ‘place’.
5.5 Concluding reflection

People’s own efforts to configure their current context create and reflect a ‘place of collaboration’ that frames the behaviour within the collaborative setting. In other words, the work and effort to configure the context result in a practice characterized by an understanding of how to cooperate, with or without degrees of consensus; a collaborative practice which constitutes a ‘place of collaboration’. During this configuration, the space, and the use of materiality in this space, is an important part in the creation of a place of collaboration. In settings of intersecting practices, the creation of boundary objects are important since they serve as mediators in the place-making process aimed at integrating places into a place of collaboration that allows communities to collaborate. Furthermore, the ‘place of collaboration’ will have an impact on previous changes, such as introduced computer-based tools for example.

Reflecting upon these findings, I would argue that the concept of ‘places of collaboration’ deserves some attention in relation to the key activities of CSCW research. While understanding and designing have been perceived as the two key activities of CSCW research, I want to point to a third important activity in CSCW research and to the challenges that come with it. This implies the challenge of supporting the nature and requirements of cooperative work with the help of computer-based technology. For this discussion, I refer to a comment received from one of the reviewers regarding the SVOP binder discussed in Paper 1. The reviewer commented that “The paper does not pay sufficient attention to the downside of the binder practice, namely the presumably redundant work the various care givers have to put in to update their own respective files and systems, write reports, update work schedules, etc”. In a first view, the reviewer makes a relevant point regarding the potential problems related to the binder practice. However, reflecting upon this practice from the perspective of ‘place of collaboration’, the additional work does not seem to be a problem. Rather, it is a necessity for the purpose of collaboration. People configure their context for the purposes of supporting cooperative work, and at the same time they also support their own individual work. This configuration may not always seem efficient when observed by outsiders, but it reveals crucial aspects of the place of collaboration, aspects that must be considered also in the design to support this setting. In fact, from a designer’s perspective the home care workers’ configuration to support their cooperative work in the elderly care context is
difficult to match. With the SVOP binder, the workers created a tool that allowed an integrated care that went beyond organizational boundaries. Another example is the development of the collaborative e-marketplace. Due to the initial lack of understanding of this context, the development process resulted in a collaborative e-market without activities or interaction. Again, while the current configured context in the local food sector may not always support effective work and collaboration as evaluated at the outset, it shows important aspects that need to be considered for the design and development of technology intended to support this setting.

To conclude, understanding the nature and requirements of cooperative work with the objective of designing computer-based technologies that support cooperative work arrangements is a challenging effort. For this effort and in view of ‘places of collaboration’, I suggest a development of CSCW technologies that supports people in their own efforts to configure their current context for the purposes of collaboration.
Chapter 6: Conclusion and future work

The intention with this work was to produce insights into real-world conditions that are essential for the development of CSCW technologies and conceptually interesting for CSCW research. My research aim was to understand people’s efforts to configure their current context for the purposes of collaboration. To this end, four collaborative settings were examined with the help of three core concepts from CSCW literature: ‘place’, ‘space’ and ‘boundary objects’.

The studies revealed that people’s effort to configure the current context creates and reflects a ‘place of collaboration’. In other words, people’s efforts to configure the context result in a practice characterized by an understanding of how to cooperate: a collaborative practice that constitutes a ‘place of collaboration’. During this configuration, the space and the use of materiality in this space is an important part in the creation of a place of collaboration. In addition, people configure collaborative contexts of intersecting practices by creating boundary objects. Boundary objects serve as mediators in a place-making process for the integration of places into a ‘place of collaboration’ for several practices. What is more, the dynamics of a place of collaboration may affect changes in existing modes of working and in computer-based tools that have been introduced into the workplace. The people and practices that constitute the place will in turn re-configure the place of collaboration, including the space and objects available due to the new circumstances.

In essence, this thesis contributes to the understanding of collaborative settings by introducing the perspective of ‘places of collaboration’. This perspective is particularly important when designing computer-based technologies that support collaborative settings. People configure their context for the purpose of supporting cooperative work, but also to support their own individual work. A ‘place of collaboration’ is a social product that cannot be designed, only designed for. Therefore, to truly understand a ‘place of collaboration’, it is essential to understand how people configure space. These configurations may not necessarily be efficient when evaluated by outsiders, but they reveal crucial aspects about the place of collaboration that must be considered also when designing to support this setting. To aid this effort, an important subject for future research and technology development
is to consider how to support people in their own efforts to configure their collaborative context.

The challenge for design is to empower people with the resources they need to create, configure and re-configure their current context for the purposes of collaboration. To address this challenge in a practical way, there is a need for computer-based tools that can be changed dynamically. Such tools may spring from social media and web 2.0 tools such as Facebook, Google docs, Wikis, Second Life; all highly interesting since they may be considered as IT-based 'spaces' that allow different configurations. However, research efforts should also be focused on the technological development of more flexible IT tools that remain adaptable in view of future changes. In addition to this, these tools should be applicable also outside the virtual space, in the physical work space. Most importantly, these tools must be configurable so that they enable the creation of ‘places of collaboration’.
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Collection of Papers


Paper 1.
Exploring cooperation through a binder: a context for IT tools in elderly care at home

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Abstract. This paper examines the empirical findings of a study of the work and cooperation taking place within and between the home help service and home health care in a Swedish county. The aim is to explore the current context for the design and development of IT tools that may facilitate cooperation and coordination in elderly care at home. The focus of the study is the use of a tool, a binder, which collects material considered as important to sustain cooperation between and within the two services. The paper illustrates concrete aspects of how different types of material is utilised and how the actual use of the binder reveals both advantages and disadvantages. Through focusing on the binder, aspects that are crucial to consider also when designing IT tools are made visible. These aspects include the need to support the integration of home care information and the importance of assisting asynchronous communication through the facilitation of informal information. It is also necessary to consider the mobile nature of the home care work, and the importance of a patient-centric view that promotes information sharing between the heterogeneous network of actors involved in the home care process, including the care receiver and relatives.

1. Introduction
The challenges that face the developed countries in respect of elderly care urge health and social care systems to change their current work practices and to increase their collaborative activities. The growing number of elderly people, in combination with a decreasing number of young people, requires not only new approaches to the organisation of elderly care but also new ways of working (Gröne and Garcia-Barbero, 2001; Leichsenring, 2004). In addition, there is an endeavour to make it possible for the elderly to live at
home for as long as possible instead of moving them to an institution (Anderson and Hussey, 2000; SALAR, 2006). This challenge is complex and demands different kinds of solutions. One approach that is considered crucial when providing care of good quality to the elderly in the home is improving the cooperation between health care and social care providers (Bricon-Souf et al., 2005; Reed et al., 2005; SALAR, 2006). Furthermore, technology, and information technology (IT) in particular, is often proposed as a means to facilitate aspects of the work practice and to support cooperation between different care providers (Bricon-Souf et al., 2005; Koch, 2006; Koch et al., 2004; Vimarlund and Olve, 2005).

Research regarding IT tools for elderly care at home has been conducted by different research fields and various IT solutions have been discussed. Koch (2006) presents an overview of the research on IT in the home care setting. The overview shows that the majority of the papers concerns the measurement of vital signs and audio-video teleconsultation, while a minority of the research papers is focused on IT tools that improve information access and communication in order to facilitate cooperation. Furthermore, research conducted within the field of Computer Supported Cooperative Work (CSCW) has shown that cooperation is a complex issue that requires more than the improvement of information access and communication (Bannon and Schmidt, 1989; Heath and Luff, 1991; Schmidt, 1994).

Care settings are often collaborative in nature and studies conducted from a CSCW perspective have explored these settings. These studies focus on the use of medical records – paper-based as well as computerised (Heath and Luff, 1996; Luff and Heath, 1998) – transformations in the collaborative work caused by the introduction of new technology (Bardram et al., 2005), the use of a shared information system to coordinate work (Reddy et al., 2001), temporality in collaborative work (Reddy et al., 2006), the formal and informal character of information sharing (Hardstone et al., 2004) and the use of different non-digital artifacts (Bardram and Bossen, 2005) etc. CSCW studies relevant to this paper are focused on the work and cooperation carried out in different care settings with co-located personnel, in contrast to elderly care at home. In fact, in-home elderly care has not been extensively studied from a CSCW perspective. Only a few studies have explored the implications for design of IT tools intended to support the cooperation between health care and social care providers conducting elderly care at home (e.g. Bricon-Souf et al., 2005; Koch et al., 2004; Pinelle, 2004; Pinelle and Gutwin, 2003a;
Most importantly, there is a lack of research on how the workers providing care for the elderly in their homes actually manage to work and cooperate at the present time, and how the workers use the tools currently available to support cooperation and coordination.

The aim of this paper is to explore the current context for the design and development of IT tools that may facilitate cooperation in elderly care at home. The paper analyses the empirical findings of a study of the work and cooperation taking place within and between home help services and home health care in a county in Sweden. The focus of the study is the actual use of a tool that supports cooperation and coordination. This tool is a binder that contains a collection of material considered as important for supporting cooperation between and within the two services. With the binder in focus, issues crucial to consider also when developing an IT tool are made visible. In contrast with the loosely coupled home care cooperation studied by Pinelle (2004) and Pinelle and Gutwin (2003a; 2005), the setting examined in this paper depends to a much greater extent on cooperation and coordination between workers. Furthermore, compared to hospital wards and medical units, in-home elderly care is clearly more complex. To begin with, the work is carried out in the care receivers’ homes, environments that cannot easily be changed. Secondly, the work activities need to be coordinated between different actors not only within but also across organisational boundaries. Thirdly, work activities need to be coordinated across time.

The paper is structured as follows; first I describe the research setting and method. Then, I give a general description of the binder and outline the material collected in the binder in detail. I also illustrate some concrete aspects of how the material in the binder is used to support cooperation and coordination. This is followed by an analysis and discussion of crucial aspects that must be considered also when developing IT tools related to elderly care at home. Finally, I conclude by summarising the findings from the analysis of the binder.

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1 A person in need of home help service is called a care receiver, while a person in need of home health care is called a patient. However, later on in the paper we will use the word ‘care receiver’ to indicate a person in need of both home help service and home health care.
2. **Research setting and method**

The findings examined in this paper are the result of empirical material collected from a study of the work and cooperation conducted in elderly care at home in a county in Sweden during 2002-2004 (Broberg and Petrakou, 2003). In the county where the study took place, as in more than half of the counties in Sweden, two parties provide the elderly with care at home: social care at home is provided by the municipalities through the organisation of home help service groups (in Swedish: hemtjänst), while health care at home (in Swedish: hemsjukvård) is supplied by the county council. Therefore, care of an elderly person at home may well involve both organisations and engage different providers in the task. Several reports have shown that this cooperation does not always function properly and it is often suggested that the use of information technology may improve the situation (SALAR, 2006; SOU, 2004). The problems with cooperation between home help service and home health care were also observed by health and social care managers in the studied county and a project was therefore initiated with the purpose of improving the problematic situation. One part of the project consisted in a study of the work and cooperation taking place in and between home help service and home health care in order to define the problems that occurred in the daily work. In this paper, I examine some of the empirical material collected by that study.

The empirical material was collected through observational studies, interviews and group discussions. During the observational studies, a number of selected workers were observed during their work shift. A total of 30 work shifts taking place during the day, the evening and the night were observed. During these studies, field notes were taken and transcribed the day after the observations were conducted. To continue, some 15 interviews were conducted with managers in both organisations while district nurses, assistant nurses and home help service workers participated in the group discussions. The aim with the interviews was to enable a holistic understanding of the work and the cooperation between and within the two organisations. Questions were therefore asked concerning the rules and obligations for home help service and home health care. The group discussions focused on four themes: problematic issues concerning the inter-organisational cooperation between home help service and home health care, problematic issues concerning work activities, problematic issues concerning cooperative activities and finally general issues concerning information needs and tools.
2.1 Home help service

The home help service units (10 units) in the studied municipality belong to the Administration of Health and Social Care and are headed by a unit manager who is responsible for the staff, the budget and the administration. A home help service unit consists of two or more home help service groups. Every group has a meeting point, which is often situated in an apartment. The home help service units consist of 22 day shift groups that are reorganized in the evenings to form approximately 10 evening shift groups which cover different geographical areas. In addition, a unit also consists of 4 night groups that handle the entire municipality. The number of workers in each group varies between 10 to 15, depending on the number of care receivers in the area.

The home help service provides help with food, getting dressed, cleaning, care assistance, practical services and social care and they also respond to alarms. To apply for home help service, the care receiver or his/her relatives sends an application to a care administrator who is located in a special department within the care administration of the municipality. When an application is granted, a notification is sent to the home help service group and to the unit manager. The group includes the new care receiver in their planning and a contact person is chosen from the staff. The contact person is ultimately responsible for the care receiver and for his/her living accommodation and care. For example, it is the contact person who should contact other care providers such as primary care if needed.

In order to obtain information about a new care receiver or to acquire updated information about a care receiver’s needs, all meeting points have a fax machine. Fax messages with information regarding new care receivers and the care interventions they should receive are sent from the care administrator. In addition, the care workers send information through the fax machine to the care administrator if they observe a need to change the interventions.

The studied day shift group shared two mobile phones that were provided by the municipality. These mobile phones are used mainly for receiving alarms. Naturally, the mobile phones are also used if the care workers need to communicate. If they need information which is stored at the meeting point, they can call the fixed telephone which is located there. However, they cannot be certain that someone will answer since no one is assigned to
monitor that phone. During the evening, all personnel have mobile phones, since only two people from each day shift group work during the evening. In addition, all night personnel have mobile phones.

### 2.2 Home health care

Health care in Sweden is provided by the county councils which are responsible for organising hospitals and primary care. Primary care is administered by primary care centres situated in every municipality. Every municipality is geographically divided into districts and a primary care centre is responsible for one or more districts depending on the number of inhabitants. The primary care centres are staffed by physicians, district nurses, nurses and assistant nurses. At the studied county council, home health care is a task performed by district nurses supported by assistant nurses in primary care. Home health care is provided during the day and in the evening. During the day, home health care is provided by every primary care centre. In the evening, an evening group handles all patients in the municipality.

The district nurses have a greater responsibility and conduct more advanced interventions than the assistant nurses. A district nurse may give a care diagnosis. This means that when a district nurse examines a patient, she judges if the patient should be treated through interventions provided by her (care interventions) or if the patient needs to consult a doctor to receive a medical diagnosis. Furthermore, the district nurses have a reception where the people of the district can make an appointment. The care interventions provided by district nurses both at the reception as well as in the patients’ home include checking the blood pressure, binding up wounds, giving insulin, taking samples for testing, insert pharmaceuticals into medical dispenser units, dispensing medicine and eye drops, helping with surgical stockings and also giving advice and support to their patient. Assistant nurses assist the district nurses with minor treatments such as helping with surgical stockings, binding up wounds, treating wounds with cream, administering eye drops and insulin. Some of the interventions conducted by assistant nurses in home health care could be delegated to the home help service workers.

The home health care personnel use a computerised patient record system which can only be accessed through computers located at the reception. This system is used within all primary care and contains functionalities other than
the record system such as booking appointments at the reception and sending messages to personnel within primary care. Of the items included in the patient record, the nursing care plan (in Swedish: omvårdnadsplan) is the most important document for a district nurse. This plan is created at the beginning of a patient’s care process. In addition to this, the district nurse needs to document every contact that she has had with the patient throughout the care process. She must thus specify what has been done during a visit, in what condition the patient was in when she arrived, and also which people have been contacted. While working in the patients’ homes it is impossible to access the patient record system. If the nurse wants to bring information from the patient record to a home care visit, she has to print information from the system or enter the information into her calendar before she leaves her office. Otherwise she has to phone someone who is at the reception or go back to the reception herself to get the information needed. In contrast to home help service workers, all district nurses and assistant nurses have mobile phones.

Since the evening group also belongs to primary care, each person must document his or her interventions using the same computerised patient record system as the dayshift personnel use. However, workers in the evening group also send faxes to all the day shift districts to report items of special interest. Similarly, the dayshift personnel send faxes to the evening group if there is a new patient that is in need of home health care during the evening, and they also phone the evening group if there is something this group should pay special attention to.

2.3 Elderly care at home

Elderly care at home involves not only home health care and home help service but also, for instance, hospital visits, physiotherapy at the hospital, physiotherapy at the primary care unit as well as family and relatives. It is of utmost importance that the care process is discussed with the care receiver. Furthermore, during the late 1990s the National Board of Health and Welfare (SOSFS1996:32) issued new requirement regarding information sharing and cooperative care planning to the municipalities and county councils. Therefore, when an individual is scheduled to receive care at home for more than two weeks, a care plan meeting (in Swedish: vårdplanering) with all parties involved is mandatory. Usually, this happens after an elderly person has been treated at the hospital. During this meeting, the care providers and the care receiver with relatives discuss the care interventions that need to be conducted in order for the care receiver to be able to live in his/her own
home. Approximately 4-7 people attend these meetings; the nurse at the hospital who initiates the meeting, the care receiver and his/her relatives, personnel from the home help service and home health care and finally the physiotherapists from both the hospital and from primary care if needed. Home health care is represented by a district nurse or in some cases an assistant nurse. The home help service is represented by the care administrator, who writes the application for home help service. If possible, the presumptive contact person is also at the meeting.

3. The SVOP binder: a tool for cooperation and coordination

In order for the home help service and the home health care workers to be able to cooperate and coordinate their efforts during the care process, there is a great need of information and communication. Since the new guidelines were issued in the late 1990s this is even more so the case. Therefore, in 2001-2002 a project called Rehab 300 was conducted. As a part of this project, workers and managers at the studied municipality and county council constructed an information and communication tool, the SVOP binder, that may provide sufficient material for cooperation. SVOP stands for “coordinated health care and care planning” (in Swedish: Samordnad Vård- och OmsorgsPlanering). The binder has been modified a couple of times over the years and is here described in its most recent form.

The SVOP binder, Figure 1, is considered the care receivers’ property and is used for storing, documenting and communicating information about the care receiver and his/her care process. Essentially, when an elderly person is in need of both home health care and home help service, as detailed by the care plan meeting, the district nurse compiles the SVOP binder. The binder is placed in the care receiver’s home (often in the kitchen) and consists of different types of material. The binder collects two types of material: material that used to be kept separately by the two organisations and material needed to support cooperation. What the latter type of material should consist of was initially discussed during the Rehab 300 project. Furthermore, the inside of the binder provides space for inserting cards such as the patient’s identification card, needed when visiting primary care or the hospital. There is also space for inserting medical prescriptions and a pharmacy card shown when purchasing pharmaceutics from a pharmacy. See Table 1 for a complete description of the documents in the binder. If needed, additional material is
included in the binder such as a wound status, catheter reports and fluid charts.

Figure 1: Left – The front of the SVOP binder. Right – A view of the inside of the binder.

In Table I, the documents collected in the binder are divided according to their function. “Read-only” refers to documents that are only updated when the complete document is replaced. “Writeable” refers to documents that may be annotated. “Other” is material that is not always required to coordinate the home care process but is needed in other situations. The table also describes the proposed use of each document, the worker/s responsible for updating each document and from where the document is collected. Along with the material in the binder, observation of the actual use of the binder showed that material was also attached to the binder such as post-it notes and/or a note pad. This is not included in the table but described later.

As shown in Table I, the binder consists of several documents which provide the workers with information for administering home care interventions and for supporting cooperation and coordination between the workers involved. During the observations, it was found that the actual use of the binder has both advantages and drawbacks. More importantly, the binder and its use highlight many important issues essential to cooperation. In what follows, I illustrate some concrete aspects of how some of the material collected in the binder is used.
Table I: The material in the SVOP binder.

<table>
<thead>
<tr>
<th>Read-only</th>
<th>Use</th>
<th>Responsible</th>
<th>Collected from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work plan</td>
<td>Description of home help service interventions during morning, afternoon, evening and night.</td>
<td>Contact person</td>
<td>Home help service</td>
</tr>
<tr>
<td>Contact information</td>
<td>Information about all involved in the care process and their contact information.</td>
<td>District nurse and contact person</td>
<td>Only in the binder, facts collected from patient records and home help service</td>
</tr>
<tr>
<td>Summary of care interventions</td>
<td>Overview of the care receiver’s social situation and health condition.</td>
<td>District nurse, contact person, care receiver and relatives.</td>
<td>Only in the binder</td>
</tr>
<tr>
<td>Prescribed pharmaceuticals</td>
<td>Information about medicines and prescriptions.</td>
<td>District nurse</td>
<td>Patient records from hospital and primary care</td>
</tr>
<tr>
<td>Discharge information</td>
<td>Information from the hospital after discharge or from a physician in primary care after a visit.</td>
<td>Hospital personnel or physician in primary care</td>
<td>Hospital or physician in primary care</td>
</tr>
<tr>
<td>Physiotherapy interventions</td>
<td>Documented if needed by describing the problem, the procedure and the follow up.</td>
<td>Contact person</td>
<td>Only in the binder</td>
</tr>
<tr>
<td>Current health condition</td>
<td>Description of the care receiver’s current health condition, which is needed during a hospital admission.</td>
<td>District nurse and contact person</td>
<td>Only in the binder</td>
</tr>
<tr>
<td>ADL status (Activities of Daily Living)</td>
<td>Description of the daily activities that the care receiver is able to handle personally and those which he/she needs help with.</td>
<td>Contact person</td>
<td>Home help service, Hospital</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Writeable</th>
<th>Use</th>
<th>Responsible</th>
<th>Collected from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current events document</td>
<td>Irregular events during the care process are documented but also messages between the care providers.</td>
<td>All personnel</td>
<td>Only in the binder</td>
</tr>
<tr>
<td>Signature list for pharmaceuticals</td>
<td>Confirms which medicine is given and by whom.</td>
<td>All personnel</td>
<td>Patient records</td>
</tr>
<tr>
<td>Signature list for physiotherapy interventions</td>
<td>Documents each visit by describing the problem, the procedure and the follow up.</td>
<td>All personnel</td>
<td>Only in the binder</td>
</tr>
<tr>
<td>Appointments</td>
<td>Appointments to the hospital, the primary care unit and other relevant places are documented.</td>
<td>All personnel, relatives and the care receiver</td>
<td>Only in the binder</td>
</tr>
</tbody>
</table>
Note pad | Care receiver and relatives write messages to the home care personnel. | Care receiver and relatives | Only in the binder
---|---|---|---
Other | Use | Responsible | Collected from
Signature clarification | Clarifies to whom the signature belongs. | All personnel | Only in the binder
Care receiver’s approval | Care receiver signs this document to approve information sharing between the organisations. | District nurse and unit manager in home help service | Only in the binder

### 3.1 Read-only: contact information

A SVOP binder is used mainly for elderly people who need multiple care interventions from both the home help service and home health care. These people are often in need of other types of care interventions such as physiotherapy treatment or they require continuous contact with the physicians at the primary care unit. In order to provide an overview of all the people involved in the care receiver’s care process, the SVOP binder contains these people’s contact information, including name, title and telephone number. Furthermore, the relatives’ contact information is also included. If there is a need to contact some of these people during a home visit, this makes it easier to reach the right person at the right time. One such example was observed during a home help service visit:

During a home visit the home help service worker asks an elderly care receiver how she slept the night. She describes a pain she felt all night. When the care worker helps the care receiver to get out of bed she complains about a pain in her arm. The care worker gets worried and tells the care receiver that if it hurts so much, they need to contact the district nurse. The care receiver agrees and the care worker looks in the SVOP binder for the telephone number to the district nurse. She phones the district nurse and informs her about the situation. The district nurse says that the care receiver must come to the emergency ward immediately. However, the care receiver does not want to go and the care worker tries to calm her. Since the care receiver is very anxious someone must be with her in the ambulance and at the emergency ward. The care worker consults the SVOP binder in search of a telephone number to a relative to discuss if he/she is able to meet the care receiver at the hospital.....

Having instant access to the contact information was essential in the above situation. With this, the care worker could contact both the district nurse and the relative so quickly. During the observation, the care worker declared that anxiety may have a detrimental effect on the health condition and that it was therefore necessary to contact the relative so he or she could be with the care receiver at the emergency ward and calm her down. Being able to contact the
right person at the right time is often crucial in elderly care at home, not only in these situations, but also if the needed information is not available in the SVOP binder, as will be discussed later in the paper.

3.2 Writeable: signature list for pharmaceuticals

One of the intentions with introducing the SVOP binder is to support the shared care interventions, that is, interventions that could be conducted by both the home help service and home health care workers. These interventions consist mainly of minor tasks such as administering insulin or prescribed pharmaceuticals, or treating minor wounds. When administering medicine, the workers must sign their names and write the time on a signature list. Therefore, the SVOP binder contains material for these interventions such as a document called prescribed pharmaceuticals and a signature list for pharmaceuticals. The general planning of who should do what and when is often done during the care plan meeting. However, this plan can be changed during the care process if the health status of the care receiver alters. For example, if a care receiver has been prescribed pain killers that are supposed to be administered during night time, the medicine could instead be given during the evening if the care receiver is in a lot of pain. Thus, the signature list for pharmaceuticals also provides important information for the night personnel as illustrated by the following observed situation:

The night group is visiting a care receiver who is in a lot of pain. There should be a pharmaceutical for this among the prescribed medicines that the night group is allowed to administer if necessary. However, they notice that there is no medicine to administer on this particular night. They start wondering why and look at the signature list for pharmaceuticals to see if anyone else administered the medicine. On the signing list they see that a care worker gave the medicine to the care receiver during the evening shift.

In this particular situation the signature list gave essential information to the night personnel; without it they could not have known why there was no medicine available. If the SVOP binder did not exist, the workers would have had to sign one document within each organisation since it is obligatory to document all such shared care interventions. It should also be noted that the signature list for pharmaceuticals not only provides information to the involved parties, it is also important when a care receiver’s health status is followed up on.
3.3 Writeable: current events document

One of the most important parts of the binder is considered to be the document called current events. In this document the workers involved write notes to inform each other and to report current and irregular events that occurred when they treated the care receiver. In this document, the workers can also find out if there is anything that the other care providers should pay special attention to. In addition, this document makes it possible to see patterns in the care receiver’s physical condition during the home care process. For example, if it turns out that a care receiver often falls, this indicates that something is needed to prevent the person from falling and injuring him/herself, such as special shoes or an adjustment of the care interventions.

Although the current events document could in theory be a very important cooperation tool, it was found during the observations that it is used rarely. Since the binder, and thus the current events document, is located in the care receiver’s home, the workers can only access this information when visiting the care receiver. This is unfortunate, since some of the information is needed before they visit the care receiver (this is so they can coordinate visits or prepare relevant material before the visit). Therefore, when the workers add to the current events document, they also try to reach the person who needs the information by phone, by leaving messages with other persons or, if possible, by using voice mail. Unfortunately, sometimes the messages do not reach the right person. The following observed situation describes the actual consequences of a message not reaching the right person:

The district nurse is visiting a care receiver that previously had a wound that was treated with cream. During this visit the district nurse observes that the wound has gotten worse again. Therefore, she writes in the current events document to the home help service workers that they should resume the treatment of the wound with cream. Since the binder is seldom used, it took a couple of days before the home help service worker saw this message.

Reaching personnel in home care by phone is not an unproblematic task. While all district nurses and assistant nurses have mobile phones, the home help service workers during dayshifts share only two mobile phones, and these are used primarily for receiving alarms. Therefore, district nurses often have trouble contacting a specific home help service worker. Instead of talking directly to the person that needs the information, district nurses often
leave a message with another person who answers either one of the mobile phones or the fixed phone at the home help service meeting point. Sometimes, the day shift personnel do not even bother to make notes in the binder, especially when the information is intended for other day shift personnel. Instead, they prefer phoning each other to ensure that the right information will reach the right person at the right time, even though reaching people by phone may be difficult. Unfortunately, if the day shift personnel phone each other instead of making notes in the current events document, this can lead to difficulties for the night shift personnel, since there is no other way to keep informed during night visits. The following observed situation describes one such occurrence:

When the nightshift personnel visit a care receiver, they notice that the care receiver has trouble breathing. The care workers discuss the possible reasons for this and study the SVOP binder to see if the other care providers have made notes about this. The information in the binder is not up-to-date and the care workers do not know what they should do. They know that the care receiver recently went to the hospital, but they do not know why. They decide to visit the care receiver several times during the night and talk to the dayshift group about the care receiver’s condition. When the care workers report to the dayshift it is revealed that the day shift care workers already knew about this problem and discussed it with the district nurse. Finally, the day shift tells the night shift that the care receiver’s condition will not improve and that there is nothing they can do.

The lack of adequate information not only complicated the work of the night shift personnel, it also made it more difficult to see patterns in the care receivers’ physical condition during the home care process. In addition to this, since information is not always available in the SVOP binder, personnel must sometimes spend a great deal of time phoning the people that may have the required information.

3.4 Material attached to the binder

Another important aspect concerning the binder is the use of post-it notes and a note pad. Post-it notes and/or a note pad are often placed on the front of the binder to highlight that information has been added to the binder, or to inform the other personnel of something that falls outside the scope of the current events document or of other document sections in the binder. For example, home help service workers may inform of interventions that have been postponed or left for other workers to do. Relatives also attach notes to the binder with messages to the home help service or home health care personnel such as shopping list. It is interesting to observe that there actually is a
document called “note pad” included in the binder for the relatives to use, see Table I.

4. A context for IT tools in elderly care at home

The studied setting of elderly care at home is clearly complex. The care workers need to cooperate within their own group, within their own organisation between work shifts and also across organisations. In other words, the workers are required to cooperate and coordinate their efforts across both their disciplines and their organisational boundaries while being distributed across time and/or space. Furthermore, the work is conducted in the care receivers’ homes, and these are environments that are difficult to change. Compared to the loosely coupled home care setting studied by Pinelle (2004) and Pinelle and Gutwin (2003a; 2005), the setting examined in this paper is much more dependent on cooperation and coordination between workers. In addition, there is a development towards even more extensive and tighter cooperation since health care and social care systems are required to increase their collaborative efforts in order to provide in-home elderly care of good quality. To meet these demands, the involved personnel have constructed a tool, the so called SVOP binder. This binder contains collected material that the care providers consider important for supporting cooperation between and within the two services.

In the previous section I illustrated some concrete aspects of how different types of material in the SVOP binder are used to facilitate this cooperation. The actual use of the binder reveals both advantages and drawbacks with its construction, and it highlights issues critical for cooperation in elderly care. In this section I analyse the findings from the binder case and discuss aspects that are crucial to consider when developing IT tools in the context of elderly care at home.

4.1 Coordinating by integrating home care information

One aspect that needs to be considered from the perspective of elderly care at home is the importance of coordinating the activities conducted across groups and organisations. The SVOP binder is intended to help gather and disseminate relevant information that may make cooperation and coordination easier for all involved care providers. By integrating information as shown in Table I, the SVOP binder aids care personnel awareness of the other care providers; it describes the activities that have
been conducted, and it outlines the events that have occurred during the home care process. Without the binder some of this information would not be known to co-workers from other groups, both within and across the organisations.

The integration of health care information has been the focus of studies regarding the development of electronic patient records, also called integrated care records (Fitzpatrick, 2004; Hardstone et al., 2004). An electronic patient record/integrated care record could certainly support some aspects of the cooperation in elderly care at home, but it is important to emphasize that the documents compiled in the SVOP binder cannot simply be replaced by an electronic patient record. Although some parts in the binder are gathered from the patient record, as illustrated in Table I, the SVOP binder is not a copy of the patient record. All the medical information of the patient record is not relevant for those involved in elderly care at home. Similarly, the binder does not provide all the home help information that is kept by the home help service. Furthermore, it should also be noted that while the electronic patient records contains information on a person’s life-long health record, the SVOP binder is focused on supporting information sharing and communication in the daily work. Fitzpatrick (2004) highlights a similar observation in a study of a medical unit at a hospital. In this study, the health care staff conducted their work by using what Fitzpatrick calls the working record. The working record is defined as a diverse collection of documents and forms used by the health care staff to help them plan and manage their work. This is similar to the intention with the SVOP binder, with the difference that all material is gathered in one specific place, namely in the binder.

4.2 Various degrees of informal information

Another important element of working with elderly care at home that the SVOP binder highlights is the need to communicate both asynchronously and informally. Since the home help service group of the case study only has two mobile phones to share, it is often problematic for the district nurses to reach the right person by phone. Providing all home help service workers with mobile phones might improve the situation to some extent, but phones will not eliminate the need for asynchronous communication. When administering care in the home the attention must be on the care receiver, and the care worker’s main responsibility is not to be accessible by phone to everyone. As for the night shift personnel, they communicate primarily asynchronously. Therefore, asynchronous communication is essential for supporting the
cooperation within and between home help service and home health care. Bricon-Souf et al. (2005) also highlight this issue by stating that a major feature of home care is its asynchronous character and that “team members cannot directly communicate during task realization or in an informal way during a meeting or a coffee break” (p. 811). Furthermore, the kind of asynchronous communication that is needed is not only an exchange of formal information regarding the care receiver’s health status, but also an informal discussion during the care process. The importance of supporting informal discussion has been emphasized by several researches. Hardstone et al. (2004) state that work gets done through the sharing of informal information within organisations. They also emphasize the importance of informal discussion and provisional judgement for effective cooperation within a multidisciplinary team. Furthermore, Westerberg (1999) shows how decisions are often reached in an informal way, through negotiations and discussions with others.

In this study, the current events document in the SVOP binder and the post-it notes attached to the SVOP binder allow asynchronous communication. The use of these two materials has not been legislated. Rather, they spring from a need to cooperate and to provide the best home care possible. Therefore, they also support different levels of informality, in contrast to the information gathering that characterises the construction of the patient record. Fitzpatrick (2004) makes a similar observation in her analysis of the working record where she finds various degrees of formality to coexist.

The current events document is much more formal than the post-it notes. In the current events document the personnel write notes to inform each other of irregular events that have occurred in relation to the care receiver, or if there is anything that the other care providers should pay special attention to. It is also possible to identify patterns by examining the irregular events that take place over time in a care process. The use of the current events document thus offers an overview which allows for easy monitoring of a care receiver’s health progress. The notes in the current events document also make it possible to formally store the information. In contrast to the current events document, the post-it notes are not formally stored since the message is usually disposed of after it has been received. The post-it notes that are attached to the binder also have another type of function: they can be considered as asynchronous pointers. Even though the post-it notes might be viewed as containing redundant information, they are sometimes used to
indicate that new information has been added, to remind care workers to search for information in the binder.

4.3 Patient-centric view

The third important aspect that needs to be considered in the context of elderly care at home is how the SVOP binder supports a patient-centric view. As a complement to the “clinician-centric view of work” described by Fitzpatrick (2004), the patient-centric view is essential to the context of elderly care at home. From the perspective of this context, the main intentions with the binder are to share information, to enable care providers to communicate with each other about the care receiver and also to include the care receiver and the relatives in the care process.

The working record studied by Fitzpatrick (2004) provides a clinician-centric view of work. In that study, each member of the care team contributed to the official patient chart through progress notes, examination notes etc. They also worked with various forms and documents where they could reflect on “their own view of the patient and their role in the care of that patient” (Fitzpatrick, 2004, p. 294). These clinician-centric documents were always carried around by the health-care workers of the clinic, thus helping them plan and manage their work. In home care, the care providers also work with their own “clinician-centric” documents while conducting their individual work tasks and while coordinating work within their own group. As a complement to this, the SVOP binder as such is focused on the care receiver since it assembles the information and communication necessary for the heterogeneous network of actors surrounding the care receiver to cooperate. What is more, the SVOP binder makes it possible for relatives and the care receiver himself/herself to actively participate in the care process. Therefore, the binder can reflect the views of both formal and informal care providers as well as the views of the care receiver. It is also important to note that the binder is always with the care receiver as it is placed at home and follows the care receiver to hospital and to visits to primary care.

By providing a patient-centric view of care, the SVOP binder may be considered as a boundary object (Star and Griesemer, 1989) for the heterogeneous network of actors involved in the home care process.
“Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites … they have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.” (Star and Griesemer, 1989, p. 393).

The SVOP binder serves as a boundary object in the sense that it provides all the involved actors with a common ground through supplying joint information material and enabling communication between different groups and individuals. In addition, the material and documents in the binder are not only used to coordinate the care process, but are also used to support involved individuals in daily work situations. For example, the current events document brings together current information regarding the care receiver’s general health status, information that may indicate to individual care givers that they must make a particular contribution to the care process.

The management of tools that provide a patient-centric view differs slightly from the management of clinician-centric tools. The main difference is that care providers who work with patient-centric tools need to consider that the patient and his or her relatives should be able to access the documentation that the tool provides. Therefore, the care providers should not write messages to each other that they do not want the relatives or the care receiver to read. Examples of such messages are informal medical remarks that might upset the care receiver. This constraint may be one of the reasons why the current events document is seldom used. In addition to this, privacy issues need also be considered since visitors are able to access the information in the SVOP binder.

The patient-centric view is valuable in the home care process as it facilitates the active participation of relatives and care receivers. However, the SVOP binder should not be regarded as a replacement of clinician-centric tools. Both views are required in order to provide in-home elderly care of good quality.

4.4 Accessibility and mobile work

In order to make proper use of the information and communication possibilities that the binder provides, it has been placed in the care receivers’
homes and it is also considered the care receivers’ property. The advantage of this is that the binder is easily accessible not only for the home help service and home health care, but also for all other care providers. For example, if a care receiver must go to the hospital, the SVOP binder is sent with the care receiver so that the personnel at the hospital can make notes in the binder or get a quick overview of what has happened during the home care process. Most importantly, the binder is accessible to the care receiver himself/herself and to relatives.

The placement of the binder in the care receivers’ homes and the fact that it is considered as the care receiver’s property certainly contribute to the patient-centric view described previously. However, it was observed that this placement also hampered accessibility and that it therefore failed to fully support the way the workers in home help service and home health care conduct their care. Since the binder is placed at the care receivers’ home, the material in the binder is only accessible during the actual visit. This may be unfortunate since some of the information contained by the binder needs to be reviewed before the visit, for example the messages written in the current events document. Furthermore, the information on current events is evidently of such importance that the care workers try to reach each other by phone instead of making notes in the current events document. This has resulted in important information being left out of the binder, which in turn forces the care workers to phone each other in order to become updated by the people who presumably have the information. Synchronous communication may work during the day shift, but without proper information in the binder, the night shift personnel cannot know what has happened to the care receiver or comprehend the discussions that have been conducted between the care workers during the day. Due to the restricted accessibility of the binder, the potential for asynchronous communication provided by the SVOP binder is not fully realized.

Several researchers propose mobile technology such as PDAs and laptops to support home care since their work is mobile to a great extent (e.g. Bricon-Souf et al., 2005; Koch, et al., 2004; Pinelle and Gutwin, 2003b; Scandurra et al., 2004). Such technology may be applicable also in this case to support the mobile nature of this type of care work and to make it possible for workers in home help service and home health care to receive and disseminate information wherever they are. However, to substitute the SVOP binder with mobile technology intended to support home help service and home health
care is not a straightforward task. It is of utmost importance to consider the advantages in cooperation currently provided by the SVOP binder. These advantages include the integration of home care information, the varying degrees of informal information and the participation of care receivers, relatives and other care providers.

5. Conclusions

In this paper I have examined empirical findings from a study of the work and cooperation taking place in the home help service and home health care. The focus of this study has been how a so called SVOP binder is used to support cooperation and coordination. With the binder in focus, issues crucial to consider also when developing an IT tool were made visible.

The binder was designed to meet the demands of the complexity of elderly care at home. Furthermore, the material collected in the binder has been carefully considered by workers and managers in the home help service and home health care. The care workers’ holistic understanding of the elderly care process is one of the cornerstones of the SVOP binder. The binder integrates home care information with the relevant information needed for coordinating the home care process. However, the SVOP binder is not only a collection of information; it also helps support the degrees of informal information needed in the daily work characterising care service. Furthermore, the SVOP binder promotes a patient-centric view since the aim with the binder also is to inform and communicate with other care providers and to include the care receiver and relatives in the care process. In order to make this information accessible, and to facilitate communication between these parties, the binder has been placed in care receiver’s home and is considered the care receiver’s property. Clearly, the binder provides all involved in the elderly care context with useful material for cooperation and coordination. At the same time, the SVOP binder suffers from some problems. In particular, the placement of the binder in the care receiver’s home means that the material is not accessible to the mobile care givers at all times. In addition to this, privacy issues must also be considered since everyone who visits the care receiver is able to access the information provided by the SVOP binder.

Mobile Technology such as PDAs may be used to make it possible for workers in the home help service and home health care to receive and
disseminate information wherever they are. However, to merely replace the information in the SVOP binder with a mobile tool for the home help service and the home health care workers may not be the ultimate solution. It is necessary to consider the advantage of various degrees of informal information that is supported by the post-it notes, the note pad and the current events document. There is also a need to consider how the information currently compiled in the SVOP binder can be made to accompany the care receiver in the care chain so that all care providers can access the information and communicate with each other. Finally, it is important to consider the inclusion of the care receiver and relatives in the care process when developing IT tools in the context of elderly care at home.

Acknowledgements

The study was sponsored by the eHealth Institute at the University of Kalmar. I want to thank the district nurses, assistant nurses, home help service workers and managers who participated in this study. I also wish to extend my warmest gratitude to Bo Helgeson and Päivi Jokela for reading, discussing and giving invaluable comments on the different versions of this paper.

References


Paper 2.
Integrated care in the daily work: coordination beyond organisational boundaries

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Abstract
Objectives: In this paper, integrated care in an inter-organisational cooperative setting of in-home elderly care is studied. The aim is to explore how home care workers coordinate their daily work, identify coordination issues in situ and discuss possible actions for supporting seamless and integrated elderly care at home.

Method: The empirical findings are drawn from an ethnographic workplace study of the cooperation and coordination taking place between home care workers in a Swedish county. Data were collected through observational studies, interviews and group discussions.

Findings: The paper identifies a need to support two core issues. Firstly, it must be made clear how the care interventions that are currently defined as ‘self-treatment’ by the home health care should be divided. Secondly, the distributed and asynchronous coordination between all care workers involved, regardless of organisational belonging must be better supported.

Conclusion: Integrated care needs to be developed between organisations as well as within each organisation. As a matter of fact, integrated care needs to be built up beyond organisational boundaries. Organisational boundaries affect the planning of the division of care interventions, but not the coordination during the home care process. During the home care process, the main challenge is the coordination difficulties that arise from the fact that workers are distributed in time and/or space, regardless of organisational belonging. A core subject for future practice and research is to develop IT
tools that reach beyond formal organisational boundaries and processes while remaining adaptable in view of future structure changes.

Keywords: cooperative work, coordination, integrated care, home care, home health care, home help service.

1. Introduction

Integrated care is a common concern for health and social care systems throughout the world. Since it is a broad concept, there are many different definitions of it [1]. The definition that is used in this study describes integrated care as the “...co-ordinated set of services which are planned, managed and delivered to individual service users across a range of organisations and by a range of co-operating professionals and informal carers” [2, p. 14]. This definition suggests that there is a need for both inter- and intra-organisational cooperation since multiple organisations and professionals must cooperate and coordinate their services in order to provide care to an individual.

When discussing integrated care, elderly care is often in focus [2–5]. The challenges concerning the complicated elderly care situation involve demographic changes, elderly with multiple care demands and the endeavour to accommodate the care needs of elderly at home for as long as possible [6, 7]. What is more, the trend towards deinstitutionalisation in combination with the move towards advanced palliative care, which previously was provided by the hospital, into the patients’ home, increases the number of home care interventions [8–10]. All these factors increase the need for coordinating home care work between all parties involved.

Integrated elderly care at home has been studied from various perspectives that have taken different strategies, structures and processes into account, as argued by Wijngaarden et al. [11]. Previous studies have focused on policy approaches to integrated care [4, 12], system models [13, 14] and organisational structures [8]. In addition, Information Technology (IT) is often suggested as a way to improve cooperation and coordination and support integrated care [10, 15, 16]. However, research into this field has not explored fully how the daily work is actually carried out in situ. One approach that can be used to explore this perspective is an ethnographic workplace study.
In this paper, the aim is to explore how home care workers coordinate their daily work, identify coordination issues in situ and discuss possible actions for supporting seamless and integrated elderly care at home. In addition, this paper considers home care cooperation both across and within organisations.

2. Theoretical framework: cooperative work and coordination

The concept of cooperation has a long history within the fields of social sciences and sociology. In recent years, cooperation has also been a focus within the field of Computer Supported Cooperative Work (CSCW). CSCW is an interdisciplinary research area that emerged in 1984. It involves several research disciplines such as computer science, sociology, anthropology, organizational theory and design [17, 18]. The main endeavour with CSCW research is to ‘understand the nature and requirements of cooperative work with the objective of designing computer-based technologies for cooperative work arrangement’ [19, p. 5]. While some of this research focuses on the first part of the CSCW acronym [20], other centres focus mainly on the social aspect in different kinds of cooperative work arrangements [21, 22].

The interest for CSCW has grown also in other research areas and in the industry. One of the reasons may be the demands of industry for improved tools that support coordination and help control group activities [23]. Furthermore, a growing interest for CSCW can also be found in research areas such as medical and health informatics. At the same time, these medical settings provide a rich domain for studying cooperative work from a CSCW perspective [24]. Within CSCW, cooperative work is not defined by formal organizational boundaries or structures, but by actual cooperative behavior [19]. According to Schmidt, cooperative work “emerges in response to the requirements and constraints of the transformation process and the social environment on one hand and the limitations of the technical and human resources available on the other” [18, p. 352]. An important aspect of cooperative work is interdependence. As Schmidt and Bannon argue, “people engage in cooperative work when they are mutually dependent in their work and, therefore, are required to cooperate in order to get the work done” [19, p. 7]. In order to get the work done, a cooperative work setting furthermore raises the need for coordination of the individual interrelated distributed activities. Coordination in this context implies the need to ‘mesh, allocate,
relate, schedule, etc. activities, actors, and resources with respect to each other’ [25, p. 68–9].

CSCW research has highlighted several important aspects of the nature and requirements of cooperative work. In general, it has been shown that supporting cooperative work is a complex issue that requires more than the improvement of information access, communication and coordination [26, 27]. For example, CSCW has highlighted the importance of supporting awareness (awareness is here understood as the way in which cooperative actors make sense of and act upon their joint endeavours) [28]. In addition, it has been shown that human actions are both situated and flexible according to the social and physical conditions that are in place [29]. As a response to the latter finding, cooperative work is most often explored through workplace studies in situ. These workplace studies often use an ethnographic approach that focus on the work, actions, interactions and technologies typical of complex organizational settings [30]. This methodology was also employed in the present study as described in the next section. Furthermore, in this work, the analysis of the cooperative work focuses on the coordination activities that take place in order to provide integrated care.

3. Methodology: the ethnographic workplace study

The present study was carried out in an inter-organisational home care setting in a county in southern Sweden during 2002–2004 [31]. At the studied county, home health care is provided by the county council while the municipality provides the home help service. The study setting has been described in more detail in [32]. The study was part of a broader project with the general aim to support the cooperative work in home care with mobile IT tools.

The methodology followed an iterative process that is often used in ethnographic studies. This implies that analysis is conducted through every stage of the research procedure, in the process sharpening the focus of the data collection. The actual methods used to collect data may vary in ethnographic studies [33]. In the present study, data were gathered through observational studies, interviews and group discussions.

To gain a general overview of the work domain, some 15 semi-structured interviews were carried out with managers from both the home help service
and home health care. This was followed by observational studies that were focused on the cooperation activities taking place in the daily work. During these studies, a number of selected workers were observed during their work shift. Observation of 30 work shifts taking place during the day, the evening and the night were included in the study. During these studies, field notes were taken and transcribed the day after the observations. In order to obtain a more comprehensive understanding of the views and perceptions of the home care workers, group discussions were conducted. Participants in the group discussions were three district nurses, one assistant nurse, one home help service manager and two home help service workers. The group discussions focused on four themes: problematic issues concerning the inter-organisational division of labour and the division of responsibility between home help service and home health care, problematic issues concerning work activities, problematic issues concerning cooperative activities and, finally, general issues concerning information needs and tools.

The aim when analysing data was to identify and categorise common themes, activities and/or issues which can explain how cooperative work and coordination is accomplished in the examined work domain. Therefore, the collected data were indexed according to which theme, activity or issue they illustrated. For this paper, two coordination activities are identified as particularly important for providing integrated care: planning the process and coordination during home care. The work, actions, interactions and relevant technology used in these two activities are described in the result section.

4. Results: coordination in situ

Coordination of the home care process can be divided into two main activities; planning the process and coordination during home care. In this paper, these two activities are considered as crucial when providing integrated elderly care at home. The first activity is the starting point for the cooperation between all parties involved while the second describes how the home care workers share information and communicate their efforts during the home care process. During the observations, some interesting situations occurred, which in the group discussions with the care workers were found relevant when improving cooperation and coordination in this setting. The observed situations are described below.
4.1 Planning the process

In order to deliver integrated elderly care at home, the municipalities and the county councils are required to follow the requirements from the National Board of Health and Welfare. One of these requirements concerns information sharing between care providers while the other deals with cooperative care planning before discharge from hospital [34]. Therefore, when an individual is scheduled to receive care at home after hospital discharge, a care plan meeting with all parties involved is mandatory. During this meeting, the care providers and the care receiver with relatives discuss the home care process. The following care providers attend these meetings: the nurse at the hospital who initiates the meeting, personnel from home health care, the care administrator and physiotherapists from both the hospital and from primary care if needed. Home health care is represented by a district nurse or an assistant nurse.

The care interventions provided by the home help service and by home health care are different. The home health care provides care interventions defined as health care, such as binding up wounds, giving insulin, taking samples for testing, inserting pharmaceuticals into medical dispenser units and dispensing medicine and eye drops. The home help service provides care interventions defined as care along with social care such as help with food, getting dressed, cleaning, care assistance, practical services and they also respond to alarms. Furthermore, some care interventions are defined by home health care as ‘self-treatment’ and are, therefore, not provided by the home health care personnel. However, the home help service sometimes has a different view of what ‘self treatment’ is.

An elderly patient at the hospital is about to be discharged and is in need of home care. The hospital nurse has, therefore, called for a care plan meeting. Five persons attend this meeting; the patient himself, a relative, the hospital nurse, the district nurse and the care administrator. The nurse describes the patient’s visit to the hospital and what care interventions are needed when the patient returns to his home. The patient needs help with treating a wound with a cream twice a day, a procedure that takes some time. The district nurse responds that this kind of care intervention is classified as ‘self-treatment’ and should not be conducted by the home health care workers. The hospital nurse informs the home care workers that the patient cannot perform the treatment himself due to his injuries. The care administrator responds that this kind of task is something that certainly should be done by the home
health care workers since this task is not something a care receiver could apply for help for and thus cannot be classified as part of the home help service, “….besides the home help service unit has no resources for these kinds of care interventions that take so much time….‖ The meeting ends without a final decision about who should take care of the wound.

During the group discussion, the home health care workers argued that “if the patient is not mentally capable, even simple treatments may be considered as health care interventions”. However, some patients are physically incapable to conduct the self-treatment themselves, as in the above observation, and the question then is which organisation is responsible for this person. To determine responsibility in these cases, the question is often asked if the person’s health will deteriorate until a health care intervention is needed unless given the treatment in question. Another way of determining responsibility is to decide which organization would have had responsibility for the patient if he or she had not applied for home help service. In addition to this, it is important to note that for the care receiver, home help service may be more costly than home health care. During the group discussions, the care workers argued for clearer rules or agreements about what organization should be responsible for which care intervention. The care workers also stated that resources are wasted when both the home help service and home health care are at the care receiver’s home at the same time: “When one person is making a sandwich while another person gives insulin at the same time, this does not feel as an efficient way to conduct a home visit”. However, the care workers also stated that sometimes the unit chiefs or care administrators bend the rules in the best interest of the care receiver and sometimes both the home help service and home health care workers actually conduct care interventions beyond those agreed upon during the care plan meeting.

4.2 Coordination during home care

The home help service groups from all shifts store information about the care receiver and the approved care interventions separately in non-digital form. The home health care personnel use a computerized patient record system, which is used within all primary care. However, while working in the patients’ homes, it is impossible to access this patient record system.

To manage cooperation and coordination between the organisations, an information and communication tool was constructed, called the SVOP
binder. SVOP is an acronym for ‘coordinated health care and care planning’ (in Swedish: Samordnad Vård- och Omsorgs Planering). The binder is placed in the care receiver’s home and consists of several documents and material which provide the care workers with information for administering home care interventions, for supporting involved individuals in daily work situations and for facilitating communication between the care workers involved. The binder and its use has been described and analysed in more detail in [32]. Particularly important for the present study is the fact that although the current events document facilitates communication, it was rarely used since it was available only in the care receiver’s home. This is unfortunate, since some of the information is needed for coordination purposes and important information may be received late, which in turn may affect the care receiver’s health condition. To circumvent this problem, workers who add information to the current events document also try to reach the day-shift personnel who need the information by phone. This is further complicated by the fact that the home help service workers during dayshifts (10 persons) share only two mobile phones, making it difficult for district nurses to quickly contact a specific home help service worker. For the night-shift personnel, the notes in the SVOP binder are the only way to stay informed.

To continue, care receivers in need of multiple care interventions can trigger alarms if the need arises. The home help service responds to these alarms and is, therefore, equipped with keys. Not having these keys, the home health care personnel must coordinate their visits according to the home help service’s schedule. However, information about the scheduled home help service visits is placed in the SVOP binder, accessible only during home visits. The following observation shows one consequence of this situation: A district nurse is about to make a home visit. She knows that the home help service usually makes its home visit at a certain time and she, therefore, plans the home visit according to this. When she arrives to the patient, the door is locked and she realises that the home help service worker has not arrived yet. She makes another home visit and attempts to visit the patient later when the home help service has arrived.

In addition to this, the information in the SVOP binder is not always up-to-date for several reasons. In particular, pharmaceutical information, updated by external primary care workers and taken from the patient’s medical record, tends to be inaccurate. The following observed situation illustrates an actual consequence of this problem:
A district nurse is conducting a home visit in order to insert pharmaceuticals into medical dispenser units. She takes the pharmaceuticals from the packages and in order to insert the right dosage she looks at the prescribed pharmaceuticals document in the SVOP binder. During this home visit, the care receiver shows a new package with pharmaceuticals. The district nurse consults the prescribed pharmaceuticals document and notices that the dosage of the new pharmaceutical is inconsistent with the prescribed pharmaceuticals document. The district nurse suspects that the document has been updated without her knowledge. She, therefore, drives back to the reception to search for the new document.

To summarise, the empirical findings clearly show that the tools used for information and communication do not fully support coordination during the home care process, thus forcing care workers to make additional coordination efforts.

5. **Discussion: integrated care in the daily work**

If seamless and integrated care is to be supplied, the daily work situation needs to be improved. In fact, two crucial issues need to be discussed. The first issue considers the difficulties that derive from the fact that home help service and home health care are separated between two organisations. The second issue is not related to organisational boundaries, but rather to the fact that the work needs to be coordinated while the care workers are distributed across time and/or space, regardless of organisational belonging.

5.1 **Organisational boundaries**

Coordinating home care interventions where home care is divided between two organisations is not a straightforward process. The present study has identified the planning activity, specifically during the care plan meeting, as a particularly problematic subject. The most crucial issue here is, who should assume responsibility for care interventions defined as ‘self-treatment’ by home health care. This shows that it is difficult to demarcate between treatments considered as health care interventions and treatments that are considered as possible for the patient himself/herself to conduct. There is no established definition of self-treatment and, consequently, each case is judged separately. It is quite clear that this is primarily a policy issue that needs to be resolved at an organisational level. In 2006, The National Board of Health and Welfare initiated an investigation on how to define ‘self-treatment’ in relation to health care and during 2008/2009 directions will be issued on how to handle this issue [35]. Another possible solution for improving the quality
of home care that has been discussed is the merger of the home help service and home health care into one organisation.

In 2004, The Ministry of Health and Social Affairs investigated “how medical and social care including rehabilitation and aids for disabled should be organised to ensure integrated care and service for the elderly” [36, p. 14]. This investigation resulted in a government bill to the Swedish Parliament [37]. The main argument of this bill was that the responsibility for the home help service and home health care should be provided by the municipalities, which would entail a merger of the home help service and home health care. The bill also stated that advanced home health care should remain the responsibility of the county council. Furthermore, it is possible that other services appear that also need to cooperate and coordinate with a merged home help service/home health care team. For example, the county council has recently introduced a trial service called ‘the mobile doctor’ consisting of a physician from primary care who makes home visits during daytime. Thus, even if the home help service and home health care would merge, there will still be different care providers visiting elderly in their homes. This means that there always will be a need for inter-organisational cooperation and coordination. Furthermore, integrating care by merely merging home health care and the home help service may not be the ultimate solution, as discussed below.

5.2 Distributed coordination
The second issue considers the care workers’ need to coordinate their efforts not only between organisations, but also within their own organisation across space and between work shifts.

The SVOP binder was initially constructed to support inter-organisational cooperation and coordination. However, the empirical findings show that the information in the binder is equally important for the intra-organisational coordination taking place between dayshift and nightshift. In this light, the binder supports the core aim of the cooperation and coordination between home care workers, which is the care of the care receiver. Unfortunately, the present study suggests, like [32], that the SVOP binder fails to fully serve the need for effective dissemination of information and coordination during the home care process. Additionally, the empirical findings also show that home help service workers lack the mobile phones necessary for communicating effectively with other care providers. Providing home help service workers
with mobile phones, may facilitate the immediate coordination taking place during the day shift. However, the night shift personnel cannot be reached by phone. Thus, coordination during the home care process is clearly not only an organisational matter, but primarily a technical challenge.

From this perspective, the most direct way of facilitating information and communication between care workers may be the introduction of IT tools that improve information access and asynchronous communication. Certainly, this may improve the care workers’ possibility to coordinate during the home care process. Following the CSCW research, further aspects need to be considered, explored and analysed in order to develop IT tools that effectively support coordination.

5.3 Coordination and cooperative work

The ethnographic workplace study was conducted in order to understand how coordination is carried out in the daily work, to identify coordination issues in situ and possible actions that may be taken to improve coordination in the studied setting. A problem with this kind of methodology is that data collection is quite extensive. Therefore, the analysis of the common themes, activities and issues is an important activity during the research process. As in all qualitative research, the data may be influenced by the researcher’s point of view—a problematic issue that needs to be considered during the research process. This is even more the case when conducting ethnographic studies, since one of the objectives is to capture the ‘Members’ Point of View’ [33]. To evaluate the researcher’s interpretation of the empirical findings, common themes, activities and issues have been discussed with the care workers and managers throughout the project, thus confirming the reliability of the data.

In CSCW, some criticism has been presented in regard to workplace studies intended to inform systems design [38, 39]. It has been argued that the understanding of a particular workplace is a valuable contribution in its own right. It is believed that such an understanding can inform CSCW design “through raising awareness of important conceptual issues and questioning taken-for-granted assumptions about work activities and how they should be supported” [38, p. 321]. The assumption in this paper is that this kind of understanding is equally important in the research area of integrated care. The need for coordination in this particular case shows that formal organisational boundaries do not describe the actual behavioural patterns and
division of daily work among health care providers. The core aim in the studied setting is to provide the care receiver with good-quality care, and the actors must coordinate their efforts regardless of their organisational belonging to achieve this aim. This became evident during group discussions where the care workers argued that one must ‘bend the boundaries’ regarding the issue of ‘self-treatment’ in the best interest of the care receiver. With this in mind, care workers have invented additional tools and routines to support cooperation and coordination in the workplace. Integrated care is clearly much more than organisational boundaries, policies, strategies, structures and processes. In their daily work, people cooperate and coordinate their activities to get the work done, regardless of their organisational belonging.

Again, IT tools may help to resolve some of the organizational problems faced by home care providers. In care settings, efforts have been made to develop electronic patient records, medical records and health records. These technologies were developed for a particular process or organization, and take the boundaries and structures of this process or organization into consideration. However, as shown in the present study, home care coordination often needs to transcend organizational boundaries. This further emphasises the findings of [32], which show that the context of elderly care at home involves coordination also with other care providers as well as the inclusion of the care receiver himself/herself and relatives. Furthermore, the present study also stresses the fact that new care providers might visit the care receiver at home in the future. After all, cooperative work relations emerge in response to changing requirements and resources [40].

6. Conclusions: integrated care beyond organisational boundaries

Two important issues of the studied home care setting must be addressed to support seamless and integrated care: the division of care interventions that are defined as ‘self-treatment’ and the coordination difficulties that arise from the fact that workers are distributed in time and/or space. The first issue concerns the fact that care is provided by two organisations and can be resolved through policymaking or through the merger of the home help service and home health care into one organisation. However, since informing and communicating between time shifts within an organization was shown to be more difficult than between organisations, this may not help resolve the second issue. A more effective solution to this issue may be the
introduction of IT tools that support distributed access to information and communication between all care workers involved, regardless of organisational belonging.

The findings of this paper thus suggest that integrated care needs to be developed not only between organizations but also within each organisation. In the daily work, cooperation and coordination is not entirely an organisational problem. Cooperative work goes beyond organisational boundaries and integrated care must be developed with this situation in mind, beyond organisational boundaries. In view of this, a core subject for future practice and research is to develop IT tools that reach beyond formal organisational boundaries and processes while remaining adaptable in view of future structure changes.

Acknowledgements

The study was sponsored by the eHealth Institute at the University of Kalmar. I want to thank the district nurses, assistant nurses, home help service workers and managers who participated in this study. My warmest gratitude goes to Bo Helgeson and Päivi Jokela for reading, discussing and giving invaluable comments on the different versions of this paper.

References


Paper 3.
Interacting through avatars: virtual worlds as a context for online education

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Abstract: This paper studies how a virtual world is utilised as a learning environment in an online course in higher education. The aim is to explore how this setting currently facilitates online education, and to identify those issues of interactivity that are essential in this context. The study builds on an ethnographic approach and data were collected through observations, recordings and interviews. The most important finding from this study is that the virtual world provides enhanced interactivity because it allows for synchronous communication and places the student in a spatial dimension. In order to make full use of this enhanced interactivity, the users’ technical skills must be improved and the technical problems associated with computer-generated environments must be resolved. As more and more students get acquainted with virtual world environments, new rules for social interaction emerge; when students have become used to interacting through avatars, we will be able to see the true potential of interaction in these settings.

Keywords: adult learning, collaborative learning, distance education and telelearning, interactive learning environments, virtual reality

1. Introduction
Online education is gradually becoming a viable alternative to traditional campus education due to the rapid development of information technology. This is also shown in that the number of students enrolled on online courses is increasing significantly. Many universities make great efforts to develop e-learning systems that may provide students with adequate learning environments (Hrastinski, 2007; Jokela, 2003). In addition to this, it is
recognised that collaborative learning is of great importance (Dillenbourg, 1999; Lehtinen, Hakkarainen, Lipponen, Rahikainen, & Muukkonen, 1999; Slavin, 1996) and the aim is therefore to design learning environments that support the students’ active involvement in the formation of their own understanding (Barab, Thomas, & Merrill, 2001). Essentially, current models of online education rely on the possibility for students to interact and collaborate with each other as well as with the teacher.

The key element of collaboration is social interaction, that is, the mutual influence of two or more people on each other’s behavior. Kreijns, Kirschner, and Jochems (2003) argue that collaboration and social interaction are intimately related. Similarly, if there is no social interaction there is also no real collaboration. However, by merely providing students with communication tools one does not necessarily guarantee that social interaction will take place. Specifically, previous research implies that social interaction is encouraged only if the online learning environment also allows for informal non-task specific interaction, something that emerges naturally in traditional face-to-face campus education (Hrastinski, 2006; Kreijns et al., 2003). One of the challenges in online education is therefore to make possible the student–student interaction that takes place in traditional campus education also on online courses (Guri-Rosenblit, 1999; Palloff & Pratt, 1999). In addition to this, computer mediated communication is usually categorised as either synchronous (real time) or as asynchronous (non-real time). Synchronous communication allows for immediate feedback and it has been shown that students feel more like participants rather than as isolated individuals when being a part of this (Hrastinski, 2006; Hrastinski, 2007). However, asynchronous communication may provide student control and flexibility in the course content during the learning process (Hrastinski, 2007). In this light, the endeavour in online education should be to utilise learning environments that facilitate both synchronous and asynchronous communication, thus supporting and enhancing both student–student interaction and teacher–student interaction.

In recent years, there has been a growing interest in the use of 3D environments such as virtual worlds in online education. Compared to the traditional two-dimensional web environments, a 3D environment adds a spatial dimension in which the users are visually represented as avatars that are able to move around in this environment (Dickey, 2003; Dickey, 2005; Monahan, McArdle, & Bertolotto, 2008). These 3D environments have been
studied from different perspectives, for instance how social awareness may be supported (Prasolova-Førland & Divitini, 2003), their pedagogical potential and usefulness in distance education (Dickey, 2003; Kamel-Boulos, Hetherington, & Wheeler, 2007), the teaching and learning experience afforded by this medium (Atkins & Caukill, 2009; Deutschmann & Panichi, 2009; Dickey, 2005; Richardson & Molka-Danielsen, 2009) and the design of 3D learning environments (Bouras, Giannaka, Panagopoulos, & Tsiatsos, 2006; Monahan et al., 2008). The 3D settings are assumed to bring about new possibilities but also new challenges when used as learning environments for online education. However, research has not specifically been focused on how the actual use of a 3D environment, such as a virtual world, may function as a context for online education, and how it facilitates teacher–student as well as student–student interaction. The key question then is: what types of interactions may be supported in this setting and how do these interactions function in practice?

In this paper, the aim is to explore how a specific virtual world facilitates online education, and to identify essential issues of interactivity in this context. The empirical findings are drawn from an ethnographic study of an online course called Oral production in higher education, provided through the virtual world of Second Life. A central aim for the studied course is to provide practice in interaction per se. The paper is organised as follows: First, the research setting and the methodology are described. After this, a description of the activities relevant to illustrate issues of interaction in the studied environment is presented. This is followed by an analysis and discussion of advantages and drawbacks with virtual worlds as settings for online education. The paper is concluded by a summary of the findings.

2. Research setting and methodology

The studied course Oral production in higher education is a proficiency course, designed to give the students practice in speaking English in more organised settings. Out of 23 applications, seven students were enrolled on the course during the spring term of 2008. Most of the students were from Sweden but some participants came from other European countries. The majority of the students had not previously used a virtual world.

Second Life is a 3D virtual world produced by Linden Labs and created by its residents. To use Second Life, an application must be downloaded and the
user needs to create an avatar and sign a membership. The user may then use the avatar to explore the virtual world, socialise with other avatars and/or engage in business prospects (Linden Lab, 2008). Communicating within Second Life may be conducted with the aid of a chat tool used for public and private text messages, and also by enabling a voice function whereby the user can actually speak to other users with the help of a headset.

The course included a collaborative assignment called the “Buddy program” where the Swedish students were paired up with American students. The buddy program was developed in cooperation with a teacher at the University of Missouri. This teacher runs composition courses where Second Life is used as an object of study. The students were paired up and the American students had to interview the Swedish students for the purposes of their course, whilst the Swedish students were given native English-speaking mentors who could acquaint them with the Second Life environment while at the same time providing them with the raw material with which to make presentations during the Oral production course. The course therefore started with a course launch on a virtual campus where the American and European students’ avatars were able to mingle, become acquainted and arrange to visit other Second Life sites together.

Apart from the course launch, the course schedule included five 2-h sessions on the virtual campus during which the students had specific tasks to perform and exercises to participate in. The course sessions consisted of a combination of lectures, pair discussions, group discussions and presentations. In addition to this, the sessions included some specific language-related practice. Before each session, the students had tasks to prepare, both individually and in groups, which were then delivered orally “in world”.

To support the students’ information and communication needs during the course, the teacher also created a course website and a blog. The latter was aimed to provide information about course developments and was also supposed to be used as a communication platform to keep all the involved actors in touch with each other between the virtual sessions. The course website included all the information about the course, such as the descriptions of each meeting, the assignments, the assessments and the podcasts that were distributed between the virtual sessions. In addition,
general feedback was delivered to the students through the course website, while individual feedback was delivered through e-mail.

2.1 Ethnographic study

In recent years, ethnography has become a common approach within research that aims to understand the relations between human beings and the tools they use. Mostly, these ethnographic studies intend to generate evaluative criteria for systems development and the design of new technologies by providing a descriptive context of human actions in their natural environment. This implies a holistic view of the actual activities as they occur and from the point of view of the study participants (Blomberg, Burrell, & Guest, 2002; Dourish, 2006). In addition, the aim when analysing data in ethnographic studies is to identify and categorise common themes, activities and/or issues that can explain the area that is scrutinized.

The methods employed in ethnographic studies may vary according to the conditions of the study (Blomberg et al., 2002). The conditions in the present study created quite a special situation. Firstly, the study had to be conducted within the virtual world and within the real world at the same time. Secondly, the research process depends to a great extent on the teacher’s ability to participate in the data collection; otherwise it is difficult to gather data about the communication between teacher and students conducted before and after the sessions. Finally, the data collection within Second Life greatly depends on technical conditions such as the capacity of the computer and the network in use.

The data were therefore collected through a variety of methods. In order to study the virtual world sessions, an observation avatar was created and this observer participated in every Second Life session (five sessions). As a complement, virtual recordings were taken of the virtual sessions through the teacher’s computer. In order to study the real world situation, the teacher and his workplace were video recorded during the sessions. Students were also asked to send in pictures of themselves that were taken while attending virtual sessions, this in order to observe their physical student environment. Furthermore, in order to understand the situation around the course before and after each session, interviews were conducted with the teacher as well as with the students. In addition to this, the teacher had a blog where he kept a
record of what happened during the course, including all contact with the students.

2.2 Ethical considerations

Before the start of the course, the students were informed of the research issues and the presence of an observation avatar during the course. The empirical material that is used in this paper is in some cases presented in the form of direct quotations. In order to protect the identities of the teacher and the students involved in this study, only the first name of the avatar is provided. The pictures that are used in this paper have thus been edited. Permission to publish pictures (both from “in world” sessions, but also from real world situations) has also been granted by the students. In fact, the pictures taken of the students’ real study environments have been sent to the researchers by the students themselves with a confirmation that the pictures may be published.

3. Results: interacting through avatars

In this study, three main activities/themes are identified as particularly important for identifying issues related to teacher–student and student–student interaction. These are the course launch, the virtual sessions and the time spent in between the sessions.

The course launch was observed as an important activity since the students were introduced to a new and in some cases completely unknown environment. Many students were unfamiliar with the navigational skills and social norms and rules of this environment. The virtual sessions showed how the students and the teacher interact synchronously while asynchronous interaction is mainly identified as activity “in between the sessions”. In what follows, a detailed description is given of the context in which the interactions occurred during the different activities.

3.1 Introducing a new environment: course launch

The course launch was scheduled to take place in the afternoon (16:15 CET) to synchronise the session with the American students’ schedule. The Swedish students were divided into three groups and each group was scheduled to arrive at different times. Before the course launch, the teacher sent out the schedule by e-mail and also published it on the course website. In both cases, detailed instructions were given about the activities during the
course launch and technical instructions on how to make proper use of the communication possibilities in Second Life, such as the voice function, were also provided.

When each group arrived, the teacher asked questions to identify the students (e.g. “what’s your postal code”), gave a tour of the facilities on the virtual campus, matched the Swedish students with their American buddies and made sure the students knew the assignment that had to be prepared before the following session. Since the course launch included matching up with American students, quite a few avatars were gathered in the welcome area, Fig. 1.

![Fig. 1: Course launch at the welcome area.](image)

During the course launch, it became clear that the conditions of the virtual campus create a special situation. Firstly, it was obvious that navigation in this environment was troublesome for those students who had not previously navigated a virtual world, resulting in their avatars quite often bumping into other avatars. Some of the students also seemed to experience technical problems since their avatars behaved strangely. Secondly, the voice protocol, i.e. when to speak and when to keep quiet, was not really established during this first meeting and the great number of people gathered did not make this any easier. Thirdly, the voice and/or headset configurations were rather challenging. For instance, a helpful function in Second Life is the white dot above the avatar which shows if the voice function is enabled and thus if the
avatar is able to speak. However, the headset may not be configured correctly, so even if the voice is enabled it may not be possible for the user to speak and listen in an adequate way. Finally, the relation between distance and voice in Second Life is not easy to manage. Even if the avatar may be assumed to be beyond speaking and listening distance, the sheer voice volume may suggest that the person is still very close to the listener. It should be noted that all these factors resulted in disruptions in the ongoing discussions and also affected the teacher’s role during the introduction of the course on the virtual campus. The teacher illustrated this situation on the teacher’s blog as the following excerpts show:

“ Well . . . being a teacher was like playing a complicated piece on a church organ, whilst baking a cake and working out a chess problem in your head!” . . . “ It was like being at a large and noisy cocktail party at times, but I knew that my teaching style would have to be very direct and clear in this environment (at least when I’m actually teaching)” . . . “ I ‘think’ that everyone got on OK, though I’ve got a couple of ‘reassuring’ mails to write today to people who had different degrees of technical difficulties. What I felt happened was that people became very quickly at ease in the environment – and started hanging out with each other, just as they do in RL.”

The excerpt illustrates some aspects of the teacher–student interaction. The teacher’s role during the course launch was to be a coordinator and manager of the avatars, helping them understand how to interact in this environment. In addition, the teacher had to help the avatars both with technical issues such as voice configurations and functions in Second Life, and with more practical issues such as where the different groups should stand in order not to disturb each other. The excerpt also shows a lack of awareness of the students’ real world situation (that is, what actually happened behind the computer).

Regarding the student–student interaction, the observations identified the same situation as the teacher illustrated in the excerpt. The students seemed to socialise just like they do in real world courses, trying to get to know each other, and also learning to cope with the new environment. A specific feature concerning Second Life was that the students asked each other about their real location while being “in world”, and also if the person previously had used Second Life and, if so, which places within Second Life they had visited. The student–student interaction continued also after the course launch, when some students stayed “in world” to discuss the first assignment. During this discussion, it became clear that some students had
not comprehended all the information that had been given during the course launch. The students discussed their different understandings of the assignment and even though they finally reached a common understanding of the assignment, they decided to contact the teacher to make sure that they had understood it correctly.

To conclude, the virtual course launch provided the students with a technical trial session and an opportunity to get to know the virtual campus and, what is more, an opportunity to interact with their classmates in a more informal way just as during a real-world campus course launch.

3.2 Interacting “in world”: the virtual sessions

The virtual sessions that followed the course launch were constructed in a similar way. Generally, each session started with the students gathering in the welcome area. This was followed by a short lecture in a lecture hall and after this students would move onto specific exercises. It is interesting to note that even if the course was given in a virtual world that has no physical limitations, the lecture hall was similar to a “real world” classroom, as shown in Fig. 2a.

As in a traditional lecture hall, the teacher was standing in front of the students while the students were sitting down. In contrast to a real world classroom, the “real” students were distributed in different places (Fig. 2b) and they were embodied by avatars in the same lecture hall. However, since the Second Life application did not have a “raising the arm”–gesture function for the avatars to use, the students had to use the voice function, thus
calling the teacher by his name to stop the current lecture in order to ask questions. Furthermore, during the lectures, it is not always possible to see if the students’ experience any disturbances since the avatars are sitting down and cannot show that they have a problem of some sort. If technical problems occur, it is not immediately obvious to the teacher and other students due to delay in the Second Life application.

![Image](image.png)

Fig. 2b. At the same time in real life.

The exercises that followed the lectures consisted of presentations, pair exercises and group discussions. During the interviews, the students were asked about the difference between making a virtual presentation compared to in real life presentations. In a virtual presentation, it is difficult to “interpret” the audience’s reactions and adjust the performance accordingly with your body language, tone of voice, etc., which is possible to do in real life presentations. One student stated that “It becomes more like talking to a wall, and the focus is shifted from the audience towards how you yourself sound”. The student also stated that this may be both a positive aspect (because no one can disturb you and your attention) but also a negative (because there is no physical contact and interaction with the audience).

During the student–student pair and group exercises, the students were spread around the virtual campus in order to not disturb each other. In the mean time, the teacher’s avatar flew above the students in order to listen without disturbing the ongoing discussions with his presence, interfering only when there was a need to make immediate corrections to the usage of the English language and to give feedback on the students’ performances. However, since Second Life is an open virtual world, disturbances may occur if outsiders appear during the lecture or during exercises, as Fig. 3 illustrates.
One important remark here is that when this “cat woman” avatar arrived, the observer did not notice a break in the discussion. During the interviews, a question was asked if the outsider in this case took focus from the main discussion due to his/her appearance or arrival. The students and teacher stated that it was merely a brief distraction and similar to situations that may happen on a regular campus course.

3.2.1 Utilising the spatial dimension

Navigating the spatial dimension of a virtual world was a new experience for most of the students and during the first meetings, many did not know how to move around in this world. However, virtual worlds enable several different ways of communication that may be helpful when the students learn how to cope with the new environment. The spatial dimension per se can also contribute to enhanced interaction. The excerpt from the video recordings shown in Table 1 illustrates several of these aspects.

The excerpt in Table 1 shows how one student at first seems to have trouble with navigation, and also with the screen view, leading to a disruption in the teacher’s monologue about the exercise. Later in the excerpt (no. 15), it turns out that the student that was assumed to have technical problems with the Second Life application, actually did not have a mouse available. When analysed in more detail, the excerpt also shows some noteworthy aspects concerning interaction in this context. It is interesting to note that the student experiencing technical problems sends a public chat message to explain one
of her problems (no. 5), in order not to disturb the teacher in his monologue and to not interrupt the task description, thus letting the teacher answer her query at the appropriate time. Furthermore, by making this chat note public, all students are alerted to a technical issue that may be important to them as well. Sending a public chat message also allows the other students to help out, since the students may send public or private messages to answer questions that arise. In fact, it is quite possible for students to send private chat messages to each other during the lectures, the discussions, the exercises, or during any other activity “in world”.

Table 1: Excerpt from observational notes.

<table>
<thead>
<tr>
<th>Teacher’s monologue</th>
<th>On screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All avatars are standing at the welcome area of the virtual campus and turned</td>
<td>1. All avatars are standing at the welcome area of the virtual campus and</td>
</tr>
<tr>
<td>towards Davric (the teacher)</td>
<td>turned towards Davric (the teacher)</td>
</tr>
<tr>
<td>2. “Ahm...the idea now is that we’re gonna practice breaking in to conversations,</td>
<td>3. Yaelta starts moving towards the teacher and bumps into him.</td>
</tr>
<tr>
<td>Ahm..what you’re gonna do iss ahm, in pairs you are going to tell each other what</td>
<td></td>
</tr>
<tr>
<td>you’ve found out about Second Life already. And in a moment, when you have the</td>
<td></td>
</tr>
<tr>
<td>chance to get started...”</td>
<td></td>
</tr>
<tr>
<td>4. “You don’t need to come and push me Yaelta its all right then...hahahaha, yea</td>
<td>5. Yaelta writes a public chat note, that she sees everything from afar.</td>
</tr>
<tr>
<td>no its, it happens sometime, you, your fingers kind of slip on the buttons, and</td>
<td></td>
</tr>
<tr>
<td>you end up like, you know, walk in to people, ah, but don’t worry about it we are</td>
<td></td>
</tr>
<tr>
<td>all good friends here right. Ahm now then guys ahm...when you ah, ahm...“</td>
<td></td>
</tr>
<tr>
<td>6. “…yeah right, what you might need to do, if that happens Yaelta is, if you’ve</td>
<td>7. When the teacher describes how to use the scroll mouse, the virtual</td>
</tr>
<tr>
<td>ah got a mou, a scroll button on your mouse, if you scroll it away from you, you’ll</td>
<td>recordings show that he uses his own scroll at the same time as he explains</td>
</tr>
<tr>
<td>eh then every- one gets closer, and if you scroll it towards you, everyone gets</td>
<td>how to use it.</td>
</tr>
<tr>
<td>far, eh further way, right. So if you, if you scroll it back real quickly, then</td>
<td></td>
</tr>
<tr>
<td>everyone gets tiny, and then scroll forward, and then you almost feel like jumping</td>
<td></td>
</tr>
<tr>
<td>on to peoples throats right.”</td>
<td></td>
</tr>
</tbody>
</table>
Lack of awareness of the avatar’s/person’s real world situation has previously been stated as a challenge. However, the excerpt from Table 1 shows that in some cases this awareness may come about as a result of the spatial dimension and the 3D representation of the students as avatars. As an example, in (nos. 9–12) it is quite clear that the students were about to misunderstand a specific task since they started to walk to the assigned bench before the teachers had finished explaining the entire exercise. This misunderstanding was visible to the teacher who therefore called the students back to the group. Another essential aspect of the spatial dimension also became apparent after about half a minute during the same recording, as Table 2 illustrates.
Table 2: Excerpt from observational notes.

<table>
<thead>
<tr>
<th>1. (The teacher is about to describe to the students how the phrase “excuse me” is used).</th>
<th>2. Davric walks towards Karero and stops in front of him</th>
</tr>
</thead>
<tbody>
<tr>
<td>“How do you say, do you say ‘excuse me’! Or do you say ‘excuse me’. Does your voice go up or does it go down? Its like this you see, look, if I come close to somebody, I’m coming close to Karero now.”</td>
<td></td>
</tr>
<tr>
<td>3. “And we’ve got something like eye contact, then I’m gonna say ‘excuse me’, voice going down.”</td>
<td>4. Davric turns and looks at a student standing at his right side a bit further away.</td>
</tr>
<tr>
<td>5. “If I on the other hand turn around, looking for Honda, I’m might very well say ‘eh excuse me’! Saying to Honda you know hey, you know eh you are a little bit further away. So it depends were you are see, if you’re close you can see them, down, further away…”</td>
<td></td>
</tr>
</tbody>
</table>

The situation in Table 2 illustrates that because of the spatial dimension of the virtual world and because of the use of an avatar, the teacher is able to visualise important aspects regarding the tone of voice and distance when using English phrases. For example, when the teacher describes how the tone of voice is used when saying the phrase “excuse me”, he also shows the appropriate distance between people with his avatar. Thus, he adds an extra dimension to the course content in terms of specific teacher–student interaction.

### 3.3 Staying connected: in between sessions

In between the virtual sessions, the students had to prepare their assignments, individually or in groups. During the interviews, the students stated that when they prepared their group assignments, the group meetings were conducted synchronously in Second Life. However, the coordination and planning of the meetings were made asynchronously through e-mail.

The course information was always available through the course website and the course blog. However, it was found that the teacher announced the same information with the help of podcasts and e-mail, as he did orally during the
virtual sessions. In the interviews, the teacher stated that the multi posting of information was an entirely conscious choice.

“The connection to students on distance courses is very fragile – and at the same time there’s a lot of information to distribute. There is also a great need of ‘reassuring/comforting’ information, that is, to confirm that ‘yes, you have done right, you have understood, it’s all working fine’. On a campus course it is more possible to get this kind of support in an unspoken, undefined way, but on a course as ‘weird’ as Oral Production, you have to do this in an artificial way.”

During the course, the communication between students and the teacher dealt mostly with technical issues and did not concern course content or the assignments to any great extent. The course blog, which provided another forum for teacher–student interaction in between the session, was actually not used as a discussion board and none of the students commented on the postings.

4. **Discussion: issues of interactivity**

The use of virtual worlds creates quite a special situation for the teacher and students that take part in online education. Firstly, the virtual world may be a new environment for the students, which means that they have to be introduced to a new world with new social norms and rules, new navigation skills and new means of interaction. Because of this, the course launch was conducted more as a trial session in the new environment in the case studied. Secondly, studying a course in this environment is to enter a mix of a real-world campus situation where you meet your fellow students (almost) face-to-face, and traditional online education during which students sit at home and conduct group assignments across the distance barrier. In the studied course, the virtual sessions were constructed around exercises and assignments so that the students could make contact and start to interact with each other. In addition, the learning environment included a web site and a course blog to support asynchronous interaction and information sharing in between the sessions. However, when focusing on interaction, using a virtual world in online education entails both advantages and drawbacks and the main issues are highlighted in the following discussion.

4.1 **Enhanced interactivity through spatiality**

Previous research has shown that synchronous communication is not only important for improving teacher–student feedback but also for establishing a
student–student relationship. It is argued that an environment that enables informal synchronous communication with fellow classmates also supports the students’ social needs (Hrastinski, 2006). The studied virtual world provides synchronous communication through public and private chat functions and also by allowing the students to use their voices. In addition to this, the virtual world enhances these interactions because of the spatial dimension in terms of informal student–student interaction as well as formal, task-specific teacher–student interaction.

During the study, the use of synchronous communication possibilities in combination with the spatial dimension was noted specifically in the situations shown in Tables 1 and 2, when the teacher was able to spot that students had misunderstood the instructions. What is more, the teacher could also use the avatar to visualise explanations during formal, task-specific communication. In addition to this, the spatial dimension of the virtual world enhanced informal, non-task specific interaction between students. For example, while talking to a fellow student, it was possible to move around in the virtual world and discuss objects that exist in this world. This in turn contributed to socialisation between students as discussed in the next section. In addition to this, the learning environment is not only restricted to the virtual campus, but includes also a diversity of activities, experiences and interactions that are a part of the virtual world that exist outside the virtual campus area. This is an important interaction aspect that has also been discussed by Lombardi and McCahill (2004). They state that the real-world university campus is a much broader social space that reaches outside the classroom and that learning takes place in the common university areas where learners may have a less structured, but equally valuable, opportunity to interact with others (Lombardi & McCahill, 2004). In this light, interactions in the virtual world may be just as valuable as interactions expected on a university campus.

4.2 Learning interaction collaboratively

One interesting aspect observed during this study was that since using Second Life per se was quite a new experience for most of the students, the socialisation activities during the first two meetings centred on how to use Second Life. The discussion between the students thus concerned questions such as how to walk, talk, run, fly, and which places to visit in the virtual world.
It has previously been stated that the key element of collaboration is social interaction and that if there is collaboration, then social interaction can be found as a part of it. The opposite is also true; if there is no social interaction there is also no real collaboration (Kreijns et al., 2003). Dillenbourg (1999) defines collaborative learning as a situation in which two or more people learn or attempt to learn something together. This implies a

“situation in which particular forms of interaction among people are expected to occur, which would trigger learning mechanisms, but there is no guarantee that the expected interactions will actually occur. Hence, a general concern is to develop ways to increase the probability that some types of interaction occur” (Dillenbourg, 1999, p. 5).

In this case, the experience of being in a virtual world became the focus of discussion, which in turn might have contributed to the students getting to know each other better. In other words, the use of the virtual world as such contributed as a collaborative learning activity, which in turn contributed to the socialisation and the social interaction between students. In this way, a virtual world per se increases the probability that social interaction between students occurs, which in turn may foster collaborative learning.

4.3 Interacting with avatars

During this study, the technical challenges with using the virtual world were quite visible. In some cases it seemed that the students lacked the skills needed to use the virtual world efficiently. However, since there was no immediate information regarding the students’ real world situation, it was in many cases difficult to determine if the problems were actually caused by technology or the lack of technical skills in the user. Another technical (but also practical) challenge is the difficulty that arises when enrolling a large number of students on a course that utilises a virtual world. In fact, this is a common challenge for e-learning in general, since it is impractical for the teacher to communicate and interact with hundreds of students (Guri-Rosenblit, 2005). In a virtual world, the users may also find it difficult to utilise voice communication. This is because in Second Life, volume is not related to the distance in the same way as in the real world. In the studied case, the number of students during the course launch made spoken communication quite challenging for the teacher as everybody talked at the same time. It was difficult to distinguish who was speaking and it was also difficult to find a reasonably quiet place for discussions.
It seems that in the beginning students rely on their conception of real world conditions also in the virtual environment. However, when the students become better acquainted with the environment, new norms and rules for social interaction emerge. A similar argument is presented by Gaimster (2008) who also implies that both students and teachers need time to practice with their avatars and to get acquainted with the environment in order to ascertain the social norms and to express themselves through their avatars. Contrary to this, in a study of an online course with the use of simple interactive tools, Barab et al. (2001, p. 136) argue that “the more technology can get out of the way, the more actual interactivity might take place in the environment. . . Participants did not interact with computers; they interacted through computers with each other.” In the present study, the focus in the beginning was on interaction with computers. However, this effort also contributed to social interaction and the students got to know each other better. Later on, when the students were better acquainted with the virtual world technology and had established norms and rules for social interaction, they started to interact with each other through avatars.

4.4 Interacting asynchronously

In order to stay connected in between the sessions, asynchronous interaction is an important feature. Furthermore, Barab et al. (2001) imply that asynchronous interaction facilitates critical thinking since students have the opportunity to reflect on and revise their work. Another important reason for facilitating asynchronous communication is to provide those students who are unable to participate in the synchronous meetings with information. In the studied course, the teacher established a course website and a blog to support the students’ information needs and encourage asynchronous interaction in between the meetings. However, as it turned out the students did not actually use these facilities to have a discussion with the teacher and with fellow students. Instead, they used e-mail for asynchronous communication.

It has been suggested that information may be embedded in a virtual world, which then also functions as an information space (Sourin, Sourina, & Prasolova-Førland, 2006). However, it may be impractical for the student to log onto a virtual world in between the meetings and navigate an avatar in order to search for information. What is more, the graphically rich and socially dynamic virtual world may be well suited for synchronous interactivity, but it can be distracting when students look for simple facts. A plain website where all the necessary information is collected seems to be an
easier way to obtain information. A more relevant question then is if asynchronous interactivity should be embedded in the virtual world or if it should be managed with the help of a separate, two-dimensional e-learning environment.

5. Conclusions: virtual worlds as a context for online education

When focusing on interaction, the study shows both advantages and drawbacks with using a virtual world as a context for online education. The virtual world provides enhanced interactivity because it allows synchronous communication in combination with a spatial dimension. The virtual world includes not only the virtual campus, but also a diversity of activities, experiences and interactions that are a part of the virtual world. In order to make full use of this enhanced interactivity, the technical challenges must be dealt with and the users’ technical skills need to be further developed. In addition to this, when the use of the virtual world is a new experience for the students, the virtual world per se constitutes a collaborative learning activity that contributes to socialisation between students. An important aspect to consider is how the students’ technical skills may affect this interaction and the teacher must be aware of the fact that the students need to become well acquainted with the virtual world before it is possible for them to focus on the actual course content. As more and more students get acquainted with virtual world environments, new rules for social interaction emerge. When students start getting used to interacting through avatars, we will be able to see the true potential of interaction in these settings.

The findings from this study also point to the conclusion that, in this case, a virtual world is currently not adequate as a learning environment on its own. There is a need to construct an additional information space in order to gather all information regarding the course and to display this information outside the rather distracting, graphically rich and socially dynamic virtual environment. Furthermore, there is a need to support asynchronous interactivity which, during the studied course, was not embedded in the virtual world. Subsequently, further research and practice is needed in order to develop, design and evaluate asynchronous interactivity within the virtual world.
Acknowledgements

This study was sponsored by the Kamimo Project, i.e. a cooperation between the University of Kalmar (Sweden), Molde University College (Norway) and The University of Central Missouri (USA). I wish to extend my gratitude to David Richardson, Alastair Creefman, Peter Adiels, Peter Carlsson, Ivar Jung, Yael Tägerud, Ole Victor, Päivi Jokela and Bo Helgeson.

References


Paper 4.
Work practice following the introduction of computer-based patient records

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Abstract
This paper examines the work practice at a hospital clinic following the introduction of computer-based patient records. The focus of the study is on how the daily patient visits are facilitated with a new paper-based tool developed by the care workers. An ethnographic approach was used and data was collected through observations and interviews. The paper identifies essential aspects of the new work practice, and the effects of introducing the computer-based patient record are made visible. Central aspects are: mobility and spatiality as essential for work and coordination, and the parallel use of two records to support different work activities. In particular, the study shows that the care workers responded to changes in their work context by re-configuring the previously used paper-based patient record to better suit their new work practice. As a result, they also re-configured their work context.

Keywords: computer-based patient records, health care, health information systems, paper-based patient records, work practice.

1. Introduction
Health care organisations implement Computer-Based Patient Records (CBPR), in order to document, store, organize and retrieve information of patients. The patient records are often integrated in a larger computer-based system here called a Health Information System (HIS). A HIS is widely defined as computer-based processes and storage of data and information for health care organizations [1]. These systems support work in different ways.
Most often they support health care administration and documentation and storage of patient records. To emphasize the patient record and enhance the functionalities of a HIS that previously were supported through the paper-based patient record, the concept computer-based patient records (CBPR) is used in this paper.

CBPR have several emphasized benefits, including better readability, availability and data quality, which reduce medical errors, improve treatment quality and facilitate communication in the chain of care [2-6]. At the same time, it is expected that the change from paper-based to computer-based patient records will have a major impact on the work practice [6-7]. In this paper, ‘work practice’ is defined as a set of activities, including the routines and exceptions that constitute work for a group of people. This means that work practice comprises the knowledge that the members have gained over time, through the actual conduct of work. With a focus on work practice it has been argued that effects of introducing new technologies such as CBPR into work settings are often unpredictable, and can only be determined in the context of use [7-8]. Most importantly, it has been acknowledged that work practices evolve over time in response to all kinds of developments [9].

Previous research on CBPR implementation, in relation to work practice, has mostly focused on potential barriers. Barriers that have been highlighted include lack of user acceptance due to change of work practice habits [4], CBPR do not meet work practice requirements and interface with existing practice systems [10] and discrepancies between the CBPR and the ways in which care workers actually use and communicate information [7-8,11]. What is more, some studies have reported parallel use and maintenance of paper-based and computer-based patient records [6, 12-13]. In this respect, a common identified issue is inconsistencies between the record systems [12-13]. While many studies focus and emphasize barriers of CBPR to support work practice, little is written on social, cultural, and organisational factors when evaluating the effects of CBPR [2, 5]. In particular, it seems there is little research on how work is actually conducted after the implementation of CBPR, that is, the new work practice.

This paper examines the work practice at a hospital clinic following the introduction of CBPR. The focus of the study is on how the work with daily patient visits is facilitated with the use of a new paper-based tool, here called the work record. The work record has been developed by the care workers in
order to cope with the new circumstances after the introduction of the CBPR. Through focusing on the work record, essential aspects of the new work practice are identified, and the effects of introducing the computer-based patient record are made visible. The paper is structured as follows; first the research site and methodology is described. Thereafter, the actual use of the work record is illustrated, followed by a discussion of essential aspects of the work practice after the introduction of CBPR. The paper ends with a concluding summary.

2. Research site and methodology

The present study was carried out at a hospital clinic belonging to a county council in Sweden. The studied clinic conducts minor medical examinations and treatments and need close cooperation with other more specialised clinics at the hospital, as well as with health care centres that usually have the first contact with patients. The clinic is staffed by doctors, nurses, secretaries, a curator and a dietician. A scheduled patient visit may involve visiting a nurse, a doctor or both a nurse and a doctor. Managers and staff at the studied clinic have expressed a wish to stay anonymous as well as keeping the clinic undisclosed. Therefore, the specialisation of this clinic is not presented.

The county council includes three hospitals and several health care centres, which all implemented a Healthcare Information System (HIS) during 2007. The present study is one part of a project with the general aim to evaluate the HIS. Some results from the project have previously been published in [14]. The HIS consists of different modules: resource planning, healthcare information administration, health care documentation, drug prescription and medication list, referrals and answers, divergence handling and statistics. With these modules, the HIS provides support for activities such as time booking and patient visit registration, handling referrals and answers, handling test results (prescription of tests, ordering of analyses and receiving of test results). The computer-based patient record (CBPR) is included as one module, which also includes support for digital dictation. Important to note is that only new information may be inserted in the CBPR, therefore only new patient records are documented in the computer system. The previously used paper-based records have been scanned and stored into another system that has been integrated as a sub-module within the HIS. What is more, at the studied clinic, some patient records are still only available in paper form. These records involve patients with severe illnesses and with a long medical
history. Each patient’s documentation has therefore been placed into binders since the scanning process is not considered worthwhile due to the large amount of documentation.

2.1 Ethnographic inquiry

This study is conducted through an ethnographic approach in order to gain a naturalistic understanding of the care workers context and actual work [15-16]. More specifically, the ethnographic approach undertaken in this study is in the form of ‘quick and dirty’ ethnography [17]. The data collection time was limited and the study was focused on a pre-defined aspect, i.e. the use of the work record in the studied setting.

Data was collected through observations combined with interviews. A total of 8 working periods of different worker categories at the clinic were observed. In addition to this, the documentation flow was followed by observing the documentation process of selected patients from the time the patient was registered in the reception to the time their patient records were documented. During the observational studies, field notes were taken and transcribed the day after the observations were conducted. Some of the care workers that were observed were also interviewed during and after their work shifts. The aim with the interviews was to understand changes of work activities and routines due to the computerisation of the patient records. The data analysis that followed focused on identifying and categorising common activities, which can explain how the work record is used in the examined setting. The findings are described in the following section.

3. The paper-based work record

To handle the work and coordination of the daily patient visits at the clinic following the introduction of computer-based paper records, two paper documents have been worked out by the care workers at the clinic (figure 1). The paper documents allow different affordances by being used separately as well as together. Together, these two papers are here called the work record.

The concept work record is similar to the concept ‘working patient record’ used by Fitzpatrick [18]. In her study, Fitzpatrick defines the working record as a diverse distributed collection of documents and forms. These are used by the care workers who contribute with information to the practical delivery of care during the patient episode. In this study, the work record is a collection
of patient data to support the medical examination, and is also used to coordinate the daily patient visit.

![Figure 1: Left - The yellow paper, “Ordination and samples”. Right - The blue paper, “own notes”.

The work record consists of two A4 papers that are coloured yellow and blue. The yellow paper (Figure 1, left) is titled ‘Ordination and samples’ and contain a space to write patient identifier information and structured squared boxes and rows to fill in during the patient’s visit. The boxes indicate tests that may be taken during a visit and the results are written on the rows. Furthermore, the yellow paper consists of boxes for general information that need to be checked during the visit, such as if the patient is scheduled due to a letter of referral from primary care, and in which system or systems the patient record exists. The blue paper (Figure 1, right) is titled ‘Own notes’ and contains a space to write patient identifier information and blank rows for the care workers to fill in during the patient visit. In the following section, I present how the work record is used to coordinate the daily patient visits, and how it is used when working with clinician-centric information and provisional documentation.
3.1 Coordinating the daily patient visits

During the practical delivery of care, the practice of handling the work record depends on the scheduled patient visits. That is, depending on if the patients are scheduled to visit a doctor, or a nurse or both, the work record is placed and used differently. In all cases the process of the work record starts when a patient arrives to the clinic and goes to the reception for registration. The secretary registers the patient in the HIS and takes notice of which care workers the patient is going to visit. Thereafter, the secretary writes the patient identification information in either the yellow paper or both the yellow and blue paper, depending on the following situations:

a) If the patient is scheduled to visit a nurse for taking samples, a yellow paper is placed at a bench at the reception (here called Position 1).

b) If the patient is scheduled to visit a doctor and a nurse, a yellow and a blue paper are placed at the same bench as in a) but in another position (Position 2).

c) If the patient is scheduled to visit a doctor, a blue and a yellow paper are given directly to the patient.

The nurses and doctors with the scheduled patient visits, receive information through the HIS when the patient is registered in the system. Thereafter, the nurse and/or doctor go to the reception to collect the yellow and/or the blue paper, before the patient is called for examination, except for situation c).

The use of the work record in situation a) continues with the patient taking the assigned tests. In the examination room the nurse logs in to the computer and consults the patient record about the tests. The nurse marks the relevant boxes in the yellow paper and after examination fills in the results. If a workday consists of fully completed patient visits, the yellow papers from several visits are collected and used by the nurse when documenting in the patient record. However, sometimes the tests are not completed during the scheduled visit. In that case the patient is urged to visit the clinic later on the day and the yellow paper is placed at the bench in the reception (Position 1) for later use.

In situation b) the patient meets the nurse who conducts some tests before the doctor’s examination. Before the nurse calls out for the patient he/she have checked the bench at the reception for the blue and yellow paper. In the examination room the nurse logs in to the computer and consults the patient
record about the assigned tests. The nurse marks the relevant boxes in the yellow paper and after examination fills in the results. The yellow and blue papers are thereafter placed on the bench at the reception (Position 2). The doctors go to the reception on a regular basis and as soon they notice a yellow and blue paper placed in position 2 they collect them and continue with the medical examination. During the medical examination and patient-doctor interview the doctor uses the yellow paper to consult the results of the assigned tests, and writes notes in the blue paper.

In situation c) when the doctor calls the patient for the examination, the patient handles over the yellow and blue paper. The doctor has checked the patient record before the meeting and during the doctor-patient interview and examination, the doctor makes notes in the blue paper. If the doctor makes the decision that tests need to be conducted during that visit, the doctor marks the boxes indicating the required tests and gives the yellow paper back to the patient. The patient then waits in the waiting room, or in the examination room for a nurse. After the tests have been taken, the nurse writes the results in the yellow paper and gives it to the doctor who finalises the medical examination and patient visit.

The process of the work record in all three situations is finalised with the documentation of the patient record. After a couple of examinations, the doctor dictates the patient visits in the respective patient record. The dictation is conducted through a digital dictation system that is included in the HIS system. Thereafter, the doctor leaves the papers at an assigned box in the secretaries’ office space. When a secretary is about to document the dictation in the patient record, she consults the blue and yellow paper if the dictation is difficult to interpret. When the dictation has been written the doctor has to sign the documentation and the secretary therefore places the blue and yellow papers at the doctor’s box. The use of a particular work record ends when the doctor has read through the patient record and given his/hers signature. After this, the yellow and blue papers are thrown away.

### 3.2 Clinician-centric information and provisional documentation

During the practical delivery of care, the work record supports clinician-centric information and provisional documentation. The concept clinician-centric is also used by Fitzpatrick [18] and captures the type of information. In this case, the two papers that jointly constitute the work record are both clinician-centric in the sense that the information provided and noted on these
documents is only inserted and updated by the care workers/clinicians. This can be compared with more patient-centric tools, where also the patient may insert and view information [19]. More specifically, the intention with the yellow paper is mainly to provide an overview of medical examinations conducted during a regular patient visit, which in turn provides information required for the medical assessment. At the same time, the yellow paper provides an overview of relevant information.

The relevant information provided through the work record is: patient identification, relevant background information for the patient visit and, information for the forthcoming update of the patient record. The latter is needed both for the update of medical examination results in the patient record and in order to locate the patient record. In the studied clinic, a patient record exists within the HIS, as a scanned record in a specific sub-module or as a paper-based record. The care workers must find out in which system a patient record is placed. The yellow paper has a section with boxes next to codes referring to paper format, where the secretary makes a mark if the patient record is in C (Computer-Based), K (Scanned record), P (Paper-based) or if a patient record does not exist.

The clinician-centric view of the work record also means that the information noted on these documents is intended to be seen only by care workers at the studied clinic i.e. this information is not documented in the formal patient record. The care workers can thus make *more informal* notes in the blue paper. Furthermore, both the yellow and blue paper are *provisional documentation*, and the doctor has time to reflect on the notes, the results and the examination, before dictating the patient record in a more formal way. One doctor stated during the interviews that the yellow paper gives a good overview of the patient examinations, while the blue paper is of utmost importance for the evaluation process before dictation, to make the right formulations for the patient record. What is more, usually there is no time between the patient visits to dictate the patient record, and sometimes it may take a whole day before dictating a patient visit that was conducted in the morning. Therefore, the blue and yellow papers act also as a reminder of the patient visit since the examination results, notes and information from a patient visit are documented in the work record.
4. **Work practice following the introduction of CBPR**

The findings from this study illustrate how the paper-based work record is used in the daily work. It is used to coordinate the patient visits and to support the work with medical examination. The work record gives an overview of clinician-centric relevant information and allows for provisional documentation, which is needed before the formal documentation in the patient record. In particular, it seems that the paper-based work record is important to cope with the daily work that is not supported through the computer-based patient record.

Through focusing on the work record and its use, important aspects in the new work practice are identified, and the effects of introducing CBPR are made visible, as discussed in the following sections.

4.1 **Mobility and spatiality**

The use of the work record shows that care workers use the work space for creating and maintaining awareness of the work activities, and to facilitate coordination. To do so, they utilize the mobility of the work record by placing documents in appointed locations in the work space, and thus visually making it apparent to other care givers that it is their turn to attend to the care receiver. At the same time, the care workers allow themselves to simply monitor if the work record is placed at the appointed positions in the work space. These findings illustrate that work and coordination is characterized by mobility and spatiality. Spatiality is defined as the occupation and utilisation of space, while mobility is defined as the quality of movement. Together these two characteristics involve the movement of people, artefacts and resources in the work space, and the studied setting suggests that people through mobility make use of the work space in which the work is conducted.

Previous research has shown that mobility of personnel and artefacts is critical for communication and collaboration [20-21]. It has been stated that in order to support their collaboration individuals rely upon their own mobility and the mobility of particular artefacts, for example by monitoring the work context for ‘cues’ that reveal information about the status and progress of a task [20, 22]. In the studied setting, spatiality is considered as an equally important aspect as mobility, since ‘cues’ of particular objects, in this case the work record, are often placed in appointed positions in work space.
It has been argued that by constraining the movement of individuals with inflexible stationary technology, such as CBPR, there is a risk of undermining an important resource in collaboration, namely, “an individual’s ability to reconfigure him or herself with regard to ongoing demands of the activity in which he or she is engaged”. [20, p. 306]. The present study shows that in order to cope with the new circumstances following the introduction of the stationary technology of CBPR, mobility is reproduced through the creation and use of the paper-based work record. In this respect, this study supports the argument that mobility is continuously produced and maintained by the participants; “people themselves are doing mobility” [23, p. 165]. At the same time the work record is an additional tool to utilize in the work space that allow ‘cues’ for the daily work and coordination of daily patient visits. In this way, the care workers created a tool to better suit their work practice, characterised by mobility and spatiality. As a result, the new work context includes the parallel use of two records.

4.2 Parallel use of records

Previous research have illustrated that the paper-based patient records have several important functionalities. This includes the fact that the paper information gives more depth, i.e. personalised comments about the patient’s feelings, worries, and details on medical histories that are usually not noted online [6]. In addition, through paper-based documents care workers share provisional formulations that are elaborated before the formal documentation in the patient record [24]. What is more, interacting with patients while working on the computer may eliminate many benefits of non-verbal signals. Using computer systems during a medical examination necessarily involves a physical orientation towards the computer [25]. For these reasons, many care work settings seem to use both paper-based records in parallel to computer-based records. In this respect, a commonly identified issue with parallel use of records is inconsistencies between record systems [12-13].

In the studied clinic, the CBPR and the paper-based work record facilitate different kind of work activities. The work record facilitates more informal and provisional documentation. This supports the need to negotiate the medical information before publishing the formal documentation in the patient record. Furthermore, the work record is used in the medical examination, thus supporting the need for physical orientation towards the patient and not towards the computer. In this respect, the work record consists of some of those affordances that were previously available through
the paper-based patient record. At the same time, the care workers make use of the many benefits of CBPR, such as better readability, availability and data quality, when reviewing patient health care information. Most importantly, the CBPR supports the information dissemination between clinics and health care centres in the county council, which may facilitate cooperation between these organisational units. In this case, the existence of two different records is valuable since the records provide different functionalities that both support the work.

4.3 Re-configurations: paper-based record and work context

Work practice evolves over time, based on the care workers common experience, knowledge, shared understanding and collective learning. Through creating and using the paper-based work record, the care workers also support their work and coordination characterised by mobility and spatiality. By doing so, their new work context includes the parallel use of two records, the computer-based patient record and the paper-based work record.

In essence, the creation of the work record shows that the care workers have customized their work context to the changing needs. More specifically, the work record contains material and affordances that were previously supported through the paper-based patient record. The work record may be seen as a reconfiguration of the previously used paper-based patient record. As a result, they also re-configured their work context. The new work context includes the parallel use of two records, which provide different functionalities that both support work.

5. Conclusion

Important aspects of the new work practice following the introduction of computer-based patient records are made visible through the care workers’ creation and use of the paper-based work record. Central aspects are: mobility and spatiality as essential for work and coordination, and the parallel use of two records to support different work activities. In particular, the study shows that the care workers responded to changes in their work context by re-configuring the previously used paper-based patient record to better suit their new work practice. As a result, they also re-configured their work context.
The paper-based work record supports those aspects of work practice that are not supported through the CBPR. It contains material and affordances that were previously supported through the paper-based patient record. As a result, the new work context includes the parallel use of two records, the computer-based patient record and the paper-based work record, which provide different functionalities that both support work.

To conclude, people configure the work context based on their knowledge and shared understanding of how work is actually conducted. If new technology is inserted in a work context, individuals re-configure this context to better suit their new work practice. The creation of the paper-based work record in the studied case reflects how the care workers re-configured the work context to their changing needs. In essence, they also evolved their practice based on how to best manage their collaboration according to the new circumstances. Regardless of future developments of technological support, it must be considered that people and their practices adapt and change with and within their work context.

Acknowledgements
This study was sponsored by the eHealth Institute at the Linnaeus University. I want to thank the secretaries, nurses, doctors and managers who participated in this study and Peter Adiels for technical assistance. I also wish to thank Bo Helgeson and Päivi Jokela for reading, discussing and giving comments on the different versions of this paper. Finally, I want to extend my warmest gratitude to Hanna Broberg for invaluable help during the data collection of this study.

References


Paper 5.
The emerging local food sector: challenging interactions for collaborative e-marketplaces

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Abstract 
This paper explores the marketing and business activities of the local food producers. The aim is to identify issues of interaction that are crucial to consider when designing and developing collaboration e-marketplaces in this context. An ethnographic approach was used to capture these activities and data was collected through observations, interviews, questionnaires and group discussions. The findings show that storytelling is an important marketing strategy that needs to be facilitated. The findings also show that social interaction needs to be supported to make it possible to establish and maintain business networks. Finally, participation and trust in the e-marketplace are crucial so that a dynamic environment can evolve. To conclude, the e-marketplace needs to be dynamic and resilient, socially as well as technically. A sustainable e-marketplace must allow for contextual changes concerning the actors involved, and development of new services. In this way the producers may also participate in and enhance the co-evolution of the e-marketplace and make it truly collaborative.

Keywords: collaboration, electronic marketplace, interaction, local food producers.

1. Introduction
In recent years, the local food sector has received much attention and there is a growing public interest, and enthusiasm concerning locally produced food (Morris & Buller, 2003; Inwood, Sharp, Moore & Stinner, 2009; Ilbery, Watts, Simpson, Gilg & Little, 2006). What is more, local food systems are considered as more sustainable regarding economic, social and environmental
aspects for regions (Feenstra, 1997; 2002; Morris & Buller, 2003). The local food sector is a particularly interesting area when new e-marketplaces are developed. The local food sector includes small businesses with limited marketing budgets, which most probably would benefit from the visibility and common marketing strategy provided through an e-marketplace. In addition to this an e-marketplace may facilitate and enhance collaborative activities between producers as well as between producers and customers.

During the last decade a considerable amount of research has focused on issues regarding electronic marketplaces, although with no particular agreement about the definition of an e-marketplace (Wang & Archer, 2007). In addition to this, Wang & Archer (2004) report on the evolution of e-marketplaces described in three phases. The aim with the first two phases of e-marketplaces was to create an enhanced competitive market for the participating actors by focusing on transactions and marketing. The move to the current third phase of e-marketplaces emerges from the need to maintain a long term relationship with business partners, thus adding collaboration functionalities to the e-marketplace. In this paper, we use a definition of Wang & Archer (2004) that is derived from the third phase, defining a collaboration e-marketplace as an Internet based electronic platform that facilitates activities related to transactions and interactions between multiple stakeholders. Within this definition interaction activities between companies are equally important as transactions, thus facilitating one of the core aspects of collaboration.

Collaboration between companies is common and it often includes the exchange and co-development of products, services and knowledge (Ziggers & Henseler, 2009). Furthermore, competitiveness has been emphasised as the main endeavour for collaboration between businesses in general and for small- and medium sized businesses in particular (Rosenfeld, 1996). In addition to this, Rossignoli (2009) highlights how new types of relationships and new forms of cooperation have been promoted and established due to the increasing use of Information and Communication Technology (ICT), and in specific e-marketplaces. However, while research on e-marketplaces has recently been devoted to understand collaborative aspects, collaboration service offerings within e-marketplaces are not well understood. (Wang & Archer, 2004; Rossignoli, Carugati & Mola, 2009). In fact, there seems to be a lack of research on one of the core aspect of collaboration e-marketplaces, that is, interaction activities that may facilitate the emergence of collaboration.
between the actors involved. Furthermore, research conducted within the field of Computer Supported Cooperative Work (CSCW) has shown that interaction and collaboration are complex issues that require more than the improvement of information access and communication (Bannon and Schmidt, 1989; Heath and Luff, 1991; Schmidt, 1994).

In this paper the aim is to identify issues of interaction in the context of local food producers that are crucial to take into account when designing and developing collaboration e-marketplaces. To explore this context we use an ethnographic approach with the perspective of Computer-Supported Cooperative Work (CSCW), to enable a theoretical understanding as well as identifying important design considerations in the development of collaboration e-marketplaces.

The paper starts with a description of the CSCW perspective followed by a description of the research setting and the methodology. Then, we illustrate the business and marketing activities of the studied local food businesses. This is followed by an analysis and discussion of the issues of interaction that are important to consider for collaboration e-marketplaces. The paper is concluded by a summary of the findings and future work.

2. Computer-Supported Cooperative Work

Computer-Supported Cooperative Work (CSCW) is an interdisciplinary research area that emerged in the mid 1980s. The main endeavour with CSCW research is to understand the social organisation of people working together, and how this cooperative work might be supported with computer systems. This includes research both on the social aspects of cooperative work, but also on the technical requirements to support the studied cooperative arrangement. (Schmidt, 1994; Schmidt & Bannon, 1992). The common perspective for CSCW research is the focus on understanding and supporting cooperative work.

With a CSCW perspective, cooperative work is not defined by formal organisational structures. Furthermore, the concept of collaboration is not distinguished as a specific form of cooperative work. In fact, the concept of cooperative work includes all types of cooperative work arrangements and the boundaries of these arrangements are defined by actual cooperative behaviour. In addition to this, an important aspect of cooperative work is
interdependence, which implies that people cooperate when they are mutually dependent in their work. (Schmidt & Bannon, 1992). CSCW research has highlighted several important aspects of the nature and requirements of cooperative work. Furthermore, it has been shown that human actions are both situated and flexible according to the social and physical conditions that are in place (Suchman, 1987). Therefore, cooperative work is most often explored through studies in situ that often use an ethnographic approach (Heath & Luff, 2000).

According to Schmidt (1994) cooperative work “emerges in response to the requirements and constraints of the transformation process and the social environment on one hand and the limitations of the technical and human resources available on the other.” (Schmidt, 1994, p. 352). However, detailed aspects on how collaboration evolves, and in particular how to support the emergence of collaboration if technical resources are provided, is less studied. In this respect, studying issues of interaction in the emerging local food sector may also provide insightful information to identify aspects on how to support collaboration in this context.

3. Research setting and method

This paper presents the findings based on an empirical study of the daily work activities of local food producers. This study is part of an ongoing three-year research project (2008-2011) supported by the Swedish Agency for Innovation Systems. The overall aim of the project is to design, develop and analyse an electronic marketplace for locally produced food products. The project includes 26 partners: 23 small local food companies, one wholesaler, one provisions consultant and one municipality, which also acts as the customer part. All partners participate in the development process of the e-marketplace and are also available for interviews, group discussions and observations of their daily work.

The definition of “local food” varies (Morris & Buller, 2003). In this paper we define local food as region specific products. The local food businesses included in this study are relatively small and they produce a small amount of products. The products vary from vegetables and milk to spices and herbs and in some cases the business includes a farm shop. The majority of the participants are family businesses and most of them do not have any employees except the owners. A few larger businesses have several
employees, the largest business in this study has 8 employees including the owners. Those businesses that are particularly small run the business more as a hobby and the producers need to have a second job. The common goals of the participants are:

- Production and distribution of food products with low CO$_2$ footprint
- Production of food products without additives.

In the studied region, municipalities, stores and restaurant have expressed the need to introduce more locally produced food in their assortment, due to the growing public interest. However, it has been argued by the customers that there is a lack of an overview of the range of products and producers. At the same time, the producers lack capacity by themselves to deliver the amount of food that is required by these customers. Collaboration is therefore necessary.

3.1 Ethnographic approach

An ethnographic approach has been undertaken during this study. This implies that analysis is conducted through every stage of an iterative research procedure in which the focus of the data collection is more and more specific. The actual methods used to collect data were observations, interviews, group discussions and questionnaires.

A total of three days of observations was conducted during different markets and trade fairs in which the producers from the project participated. During these studies, field notes were taken and transcribed the day after the observations were conducted. The markets were also videotaped and photo shots were taken as part of the data collection. To continue, some 10 interviews were conducted at the participating producers manufacturing environment. The aim with the interviews was to enable a more detailed understanding and validation of the observed situation during the markets and of their work environment and also to fully understand the objectives and aim with the observed activities and actions.

The group discussions were conducted during project meetings and they focused on three themes: issues and opportunities with collaboration between the participating producers, information needs regarding an electronic marketplace from a customer perspective and finally on functionality and structure of an electronic marketplace. During the project meetings
questionnaires were distributed and collected regarding the producers view on issues, objectives and aims with an electronic marketplace for local food producers.

4. Findings: business and marketing activities of local food producers

The private life of local food producers is closely connected to the business life since the food production is also the hobby and passion, and they show genuine interest for the products they manufacture and sell. The food is manufactured near home or sometimes actually at the home. The production process is often conducted with their own hand. In what follows, we describe and illustrate three business and marketing activities that are identified as important in the context of local food producers: selling quality by marketing identity, networks and collaboration, and acting on the physical marketplace.

4.1 Selling quality by marketing identity

The studied local food producers’ main objective is to be associated with high quality products and one way to establish this goal is to certificate the products. Examples of such certifications in Sweden are KRAV certification, ecological certification, Demeter. During the group discussions a core aspect of the producers’ description of their own work was that of pride of the products they manufacture and sell to the community. Therefore, some of the businesses strive for careful growth, which implies a controlled expansion in order to maintain the quality of the products as well as to maintain the reputation of genuine, local and craftsmanlike production. In addition to this, some of the producers are also reluctant to do business with larger retailers that require large amount of products, which may imply a rapid growth of the business.

The studied producers use a variety of selling and marketing strategies. In this study it was found that all businesses except one had established a website. The main motive for establishing a website is according to the interviews, the opportunity to be visible and to market their products. A few producers were also engaged in e-commerce through their websites. All producers consider the search for customers as an important activity in order to sell the products, although some also add other output channels to their selling and marketing strategy. For example, 12 producers have own shops at their farm, home or manufacturing premises. Many producers consider all
selling channels as valuable and necessary. However, wholesalers are not always considered as an option. The reason is that some producers fear that the wholesaler may compete with the own farm shop and/or they are afraid to lose their control to the wholesaler.

The search for customers is conducted in different ways. Some producers seek contact with potential customers through personal visits, and/or through telephone. However, personal visits are considered as most important to offer a tasting session, or as one producer stated “Our business idea is built on scent, flavour and harmony”, and implies that this may only be presented with a tasting session. In addition to this, the majority of the producers participate at marketplaces and trade fairs in order to make contact with many potential customers at once.

Customers of local food products may be retailers, restaurants as well as private persons. However, large shops are not always considered by the producers as the best selling channel. One reason is that some of the large retailers demand that all their suppliers should have a certain computer application to handle invoices. This is an impossible investment for the small local food businesses, especially if all retailers have different requirements on computer applications. However, the most important reason for avoiding large shops as retailers is that the range of products in these shops is too large. The products from small local food producers are not particularly visible in the rafts, and what is more, they are often more expensive than conventional products. Consequently the customer chooses the cheaper product. One producer states that:

“My products do actually sell better in smaller shops, like deli shops with more personal service. The customer goes to those kinds of smaller shops to seek for special products with higher quality. And also, in those shops, the manager is more engaged in talking about the products. This is an important aspect! You need to understand the product and its origin and history. If the product only stands at the raft, the customer will never understand why the price is higher than competing products. The manager must talk for the product and explain the story!”

It is quite clear, that marketing and selling the product also includes the telling of a story. It is a necessity in order to understand and experience the quality and identity of the product, which also explains the higher price. The product has a history behind its manufacturing process, and this needs to be
explained in the marketing and selling campaign as a complement to the tasting session. What is more, the person behind the product and the personal contact with customers is a core aspect to market this identity. The close connection between the product and the person behind the product is a central aspect, which was also described by one producer as “The products should stand for hand, head, heart and identity.” In this respect, the storytelling is about placing the product into a context of its origin and/or the genuine craftsmanlike production process in which the producers themselves are an important part of. The goal is to make the customer aware of the story behind and to get introduced to the products identity.

In order to create an identity of the products, it is also important to establish and maintain a close relationship with customers. In this case, face-to-face contacts are considered particularly important and in some cases the producers even visit the customers continuously, for example, they may refill the shelves at the shop with their products.

4.2 Networks and collaboration

In the studied region, initiatives have been made by different associations and organizations to connect small local food producers in networks. These networks may be defined either by the products, such as the network of jam producers, or the area/region in which the food producers belong to. Joining networks is considered as important by the producers in order to exchange knowledge, information and experiences, participate in courses as well as to collectively join fair trades and marketplaces. In some cases, the producers initiate networks by themselves.

The local food producers also consider networking as important since it may develop into collaborating activities. For example, the interviewed producers consider that it is important to jointly transport products from two or more of the local food businesses. It is not sustainable if each producer handles the transportations by themselves due to the small amount of products that are to be delivered. Therefore, it is considered as too expensive to hire a cargo company. In addition to this, some producers collaborate by selling each others products in their farm shops. However, the interviewed producers state collaborative activities are difficult to initiate and establish. The main reasons seem to be lack of time and the physical distance between the producers.
Another collaborative activity found during this study is the purchase of packaging material in which two or more producers jointly order packages for their products in order to lower the price. It was also found during this study that the food producers have started to combine their products to establish new products, such as Christmas baskets in which two or more producers fill the basket with their products. In fact, assembling products for Christmas baskets may also be viewed as a co-developed service offering for customers.

Collaboration is not only conducted between producers, but also between producers and customers in the supply chain. As previously stated in 4.1, the manager must be engaged in understanding the history behind a product and talk about it as a producer. However, the producers stated during the interviews that only managers in smaller shops are personally engaged. It is a great challenge for producers to disseminate this knowledge and collaborative behaviour to all of their customers.

4.3 Acting on the physical marketplace

The marketplace is here defined as the different trade fairs and markets that the producers visit. The marketplace may actually be considered as a condensed version of the above described activities with one difference; instead of producers searching and visiting the customers to market the products, the customers come to the marketplace searching for products.

Many producers consider the marketplace as the most important marketing activity due to the opportunity to reach many customers at the same time. What is more, the producers are able to personally introduce the products and their history and in that way, market the identity of the products. In some trade fairs, the producers also collectively market the identity of their region.

During the observational studies, it was noticed that the producers seem to spend a lot of time to carefully design their market stall as attractive as possible. The main motive is to draw customers to taste the products, which is the first step in order to initiate a conversation and in that way make contact with a potential customer. This in combination with telling the story about the business and products may lead to relationships and business deals afterwards. In addition, relationships may be established at a marketplace with other producers. In fact, the marketplace is one of the most important activities to facilitate networking with previously established contacts but
also to make contact with new producers. Sometimes, producers may even choose to stand next to each other or share the same table since their products enhance each other, such as bread and butter.

Since an e-marketplace is a new phenomenon for the local food producers a question was asked in the questionnaire, about their motivation of joining an e-marketplace. The majority answered that it may be a time efficient way to reach more and new customers as well as to find other producers to collaborate with. Some of the interviewed producers argued that it is difficult to predict how an e-marketplace may function in more detail. The main reason to this argument is the lack of knowledge about how the design and functionalities of an e-marketplace may support the unique context of the local food sector.

5. Discussion: issues of interaction

The studied setting of small local food producers is rather contradictory. On one hand we identify a craftsmanlike romantic side, often described by the producers themselves during the marketing of the products. On the other hand, the study also shows a difficult situation for the producers as businessmen in which they strive to survive and in some cases also expand. The main focus is on the search for new contacts, customers as well as other producers. At present, the producers may find contacts by joining associations and participating in markets. However, it seems difficult to get an overview of the surrounding fellow local food producers and to initiate collaborative activities with other producers as well as with customers in the supply chain. In this context, the producers would certainly be supported of the visibility and common marketing strategy provided through an e-marketplace. An e-marketplace can also been considered as a community where producers can initiate networking and find contacts, which may facilitate and enhance collaborative activities.

In the previous section we explored the business and marketing activities of local food producers; selling quality by marketing identity, networks and collaboration, and finally acting on the physical marketplace. In the following, we analyse these activities to identify issues of interaction that are crucial to consider also when designing and developing collaboration e-marketplaces.
5.1 Storytelling as a marketing strategy

In the studied setting, it was obvious that telling a story has a core value in the marketing strategy. This activity may be considered as storytelling, or narrative, a concept coined from literature research, although currently elaborated and used within several research agendas (Lundby, 2008; Robin, 2008; Simmons, 2006). The activity of storytelling became most visible during the observations of producers participating in marketplaces and during the selling and marketing activities.

It is of great importance that the customer understands and gets an experience of the craftsmenlike production and the history behind a product. Therefore, at a physical marketplace it is important to draw customers to taste the products and at the same time the producer gets the opportunity for storytelling. The rationale is to let the customer experience the quality and to motivate the higher price compared to conventional products. This may be compared to the wine industry, which has developed a wine tourism with experiential approaches including visiting wine yards, socialization with other visitors and of course tasting sessions, an established strategy that has been very successful (Mitchell, Hall & McIntosh, 2000). Another important aspect to highlight in the studied context is that the person behind a product is part of the product’s identity. Therefore, visiting customers personally is an essential activity in the producers’ daily work and face-to-face interaction is a core aspect in the producers’ marketing strategy and especially for enhancing the storytelling. In fact, direct markets based on face-to-face interaction between producers and consumers are seen as a central component of local food systems in general (Hinrichs, 2000).

If an e-marketplace should imitate the current way of interacting, the e-marketplace must support synchronous communication. Within CSCW, such systems are often called distributed/synchronous interaction systems (Rodden & Blair, 1991). Within IT-research, an ongoing objective has been to create synchronous interaction systems that match the richness and variety provided by face-to-face communication. The endeavor has been to make it possible to interact in an equal way as being physically present. (Hollan & Stornetta, 1992). However, as Hollan and Stornetta argue (p. 125, 1992), “any systems that attempt to bring those that are physical distant into a physically proximate community by imitating physical proximity will always keep the former at a disadvantage … we must develop tools that people prefer to use even when they have the option of interacting in physical proximity as they
have heretofore.” To do so, they suggest that the problems should be framed by the needs which are not ideally met in the current physical setting, but would be met in the new virtual setting. In the studied setting, it would also be unfeasible to develop an e-marketplace that imitates a physical marketplace.

In the current context, i.e. daily work of local food producers, making personal contacts with customers as well as other producers is considered as essentially important for the storytelling process and in order to establish a personal relationship. The e-marketplace should facilitate more flexibility regarding time and place when making contacts and to give the producers more control of their situation. This also implies that it is not feasible to design a system that requires more frequent use of the computer. Therefore, supporting all aspects of the storytelling process synchronously might be of minor importance, while supporting storytelling through asynchronous interaction may be of greater importance.

### 5.2 Social interaction for establishing and maintaining networks

During this study, we identified collaborative arrangements between producers, and also collaboration between producer and customer. The most common collaborative activities between the producers were joint transports of products from two or more of the local food businesses, and selling each others products in the farm shops. However, these collaborative activities were quite few and it seems that the working conditions make it difficult to establish new contacts and initiate new collaborative activities.

Collaboration between producers and customers were mostly about conveying the history of the products to the managers at the deli shop, who in turn represent the products. However, a challenge is to disseminate this knowledge to all of the customers. Furthermore, according to Kottila & Rönni (2008), there is a need for closer collaboration between the actors in the organic food chain due to issues concerning poor availability and high prices of the products, the imbalance between supply and demand, high operating costs, lack of information flows, as well as poor supply reliability, which may also be valid in the local food sector in general. Reynolds, Fisher & Hartmann (2009) further argue that vertical coordination in food supply chains may strengthen competitiveness.
In this study, it was obvious that establishing personal relationships is crucial to initiate new contacts and in long term potential collaborative activities. One of the key elements for collaborative activities is social interaction, that is, the mutual influence of two or more people on each other's behavior. Krejins, Kirschner & Jochems (2003) argue that collaboration and social interaction are intimately related and if there is no social interaction there is also no real collaboration. However, by merely providing actors with communication tools does not necessarily guarantee that social interaction will take place. (Krejins, et al, 2003). In addition to this, by merely providing tools for social interaction does not necessarily guarantee that collaboration will take place. The core aspect of a collaboration e-marketplace must therefore be to provide different opportunities to establish and maintain business networks.

First and foremost, communication tools that might trigger social interaction must be supported in a collaboration e-marketplace. In this respect, there is much to learn from social media such as Facebook. According to Harris & Rae (2009) an increasing objective with Internet marketing is to create “sustained engagement” with customers and there is a trend to follow the web 2.0 ideas of user-generated content sites. Fogel & Nehmad (2009) further argue that individuals communicate and form relationships through social media services. However, the ability to benefit depends on the provided tools for productive participation. An important aspect is to help the users to find useful information and valuable contacts (Smith, Barash, Getoor & Lauw, 2008).

In real life, interactions in the established networks have in some cases resulted in collaborative activities and co-development of products or services, such as the example of Christmas basket, which was presented in section 4.2. A collaboration e-marketplace may become an additional channel to establish and maintain these collaborative activities. Future work should focus on identifying such interactions also within an e-marketplace. These interactions should be analysed in order to understand and create new collaboration service offerings. However, as in social media services the e-marketplace needs active user participation in order to start interaction and to create the content. In this way the producers may participate in and enhance the co-evolution of the e-marketplace and make it truly collaborative.
5.3 Participation and trust for a dynamic environment

Previous research has shown that the first two phases of e-marketplaces were not profitable due to lack of participants (Wang & Archer, 2004). Participation is of outmost importance to make possible the social interaction that is needed in a collaboration e-marketplace as discussed previously. Therefore, the producers need to identify business possibilities and advantages to join the e-marketplace. Furthermore, the e-marketplace must not be viewed as a competitive selling channel, which has been an issue regarding wholesaler. In this light, the e-marketplace may be compared to a physical marketplace. The physical marketplace has a long tradition in our communities and has always been a lively open place in which producers and customers fluctuate. This allows for increasing participation among the actors involved. The question is how an e-marketplace may support this kind of dynamic and resilient interaction that currently takes place in the physical counterpart.

As in the physical marketplace the e-marketplace may be open for producers as well as customers thus making the environment dynamic and lively, and also in order to promote participation. However, an issue is whether the e-marketplace should be a totally open environment that includes all concerned food actors (including conventional food businesses). This kind of design may make some local food producers and customers to hesitate to use the e-marketplace. Furthermore, the businesses at the e-marketplace may loose the genuine feeling of craftsmanlike products, thus decreasing their trustworthiness. In this respect, it is important to establish and maintain a good reputation for the e-marketplace as a whole to increase the trustworthiness. For example, the producers and customers may agree on certain conditions as a prerequisite for the participation.

Trust is subjective and depends on how the individual evaluates a situation of risk where there is a lack of complete information. (Rindebäck, 2007). In real life, trust may be received through the richness of face-to-face communication involving the use of voice, eye contact, shaking hands etc. The challenge is to create this trustworthiness digitally. According to Friedman, Kahn & Howe (2000) the issue of trust in online contexts is much more difficult since online interactions represent a combination of human actors and technology. Furthermore, trust in online contexts is a non-functional quality, and not a function that can be built into a system. In fact, the issue of trust may change during the life-cycle of an online service.
(Rindebäck, 2007), which in turn may affect participation and the offered services.

To conclude, participation and trustworthiness are important issues to consider for making the collaboration e-marketplace a dynamic environment. However, it is important to recognize that to create participation and trust may take time. It is also important to acknowledge that user needs and behavior may change, which may lead to new service offerings in the e-marketplace. According to Rossignoli, Carugati & Mola (2009) there is a lack of research on how the stakeholders of an e-marketplace influence and shape the e-marketplace, and how an e-marketplace may have an effect on the collaborative activities. Future research should pay special attention to how a collaboration e-marketplace may allow for changing needs and requirements. Therefore, in order to make the e-marketplace more sustainable, we need a dynamic environment that promotes development of new services.

6. Conclusions and future work
This paper explored the business and marketing activities of local food producers. The aim was to identify issues of interaction in this context that are crucial to consider also when designing and developing collaboration e-marketplaces. The findings in this study suggest that three important issues of interaction need to be considered.

Firstly, storytelling is an important marketing strategy that needs to be facilitated. At present, personal face-to-face contacts are essential for the storytelling process and to establish a personal relationship with customers. However, it would be more feasible if the e-marketplace should facilitate more flexibility regarding time and place when making contacts and to give the producers more control of their situation.

Secondly, social interaction needs to be supported to enhance the opportunity for establishing business network. This may be facilitated using inspiration from social media services. Future work should focus on identifying interactions that lead to collaborative activities, in real life as well as within an e-marketplace, in order to deploy new collaboration service offerings. As in social media services the e-marketplace requires active participation from the users to initiate interaction and create the content.
Finally, participation and trust in the e-marketplace are crucial so that a dynamic environment can evolve. To create participation may take time and user needs and behavior may change. Therefore, the e-marketplace needs to be a dynamic and resilient environment, socially as well as technically. A sustainable e-marketplace must allow for contextual changes concerning the actors involved, and development of new services. In this way the producers may also participate in and enhance the co-evolution of the e-marketplace and make it truly collaborative. Future research should pay special attention to how a collaboration e-marketplace may allow for changing needs and requirements. Future work may also focus in more detail on how to engender trust, increase participation and develop services that may make a collaboration e-marketplace more dynamic and sustainable.

Acknowledgements
This study is sponsored by the Swedish Agency for Innovation Systems. The authors would like to thank the 26 partners in this project for their time and effort. We also wish to extend our warmest gratitude to Bo Helgeson for reading, discussing and giving invaluable comments on the different versions of this paper.

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Paper 6.
Collaborative e-marketplaces containing clusters of SMEs: drivers and barriers in the local food sector

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Abstract
This paper explores the current context of collaboration between small local food producers. The aim is to facilitate the design and maintenance of trustworthy collaborative e-marketplaces containing clusters of SMEs. An ethnographic approach was used and data was collected through observations, interviews and questionnaires. Our findings reveal both drivers to exploit and barriers to harness enabling trustworthy collaboration. Our current test bed is based on a research and design context that lacks mechanisms for governance. To take full advantage of the drivers and to tackle the barriers in a fruitful way, there is a need for a flexible infrastructure that allow for structured requirements, contractual agreements and validation of proposed collaboration services. To address this, we take advantage of recent developments in cloud computing, more specifically the integration of Platform as a Service (PaaS) in the support system.

1. Introduction
The importance of small and medium sized enterprises (SMEs) in national economies is widely recognised. SMEs often provide niche products, and the companies are usually built on a flat organisational structure with limited staff development. This allows for flexible and innovative organisation that quickly can respond to environmental changes [1, 2, 3]. However, due to the increasingly disruptive technology employed by e-businesses, governments and research studies stress the need for an e-business strategy if SMEs want
to stay competitive or create a competitive advantage [4, 5, 6]. A particularly important application in the area of e-business is the e-marketplace.

E-marketplaces have made a significant impact on the business world by facilitating business activities such as reducing transaction costs and improving market efficiency. At the same time, e-marketplaces extend the competitive context, leaving non-participants vulnerable to competition [7]. Despite the obvious benefits of the digital business era and the dangers of neglecting it, it is difficult to find SMEs that are engaged in e-business activities in general and in e-marketplaces in particular [4, 5, 8, 9].

A considerable amount of research has focused on the adoption, development and impact of e-marketplaces [8, 10, 11]. Notably, it has been argued that an e-marketplace must offer advantages over traditional markets to thrive, and it has been suggested that integrating collaboration service offerings could be one way to achieve this effect [7, 8]. Collaboration service offerings may even be more important for e-marketplaces specifically designed for SMEs.

Inter-organisational relationships and collaboration among SMEs are essential for maintaining a sustainable competitive advantage through innovativeness [3, 12, 13, 14]. The continuous development of new products and processes is the key to survival, growth and profitability [3, 15]. Collaboration between SMEs has traditionally been devoted to the exchange and co-development of products; sharing services, resources and knowledge as well as co-marketing and joint development [8, 12, 16]. In this respect, collaborative e-marketplaces, that is, Internet-based electronic platforms that facilitate activities related to transactions and interactions between market participants, have emerged. These new resources constitute a promising opportunity for SMEs to collaborate and create new competitive advantage in the current digital business context [1, 2, 5, 17].

Research on collaborative e-marketplaces used by SMEs has mostly been focused on participation and adoption. Research has also focused on the role of the collaborative e-marketplace and its implications [9, 17, 18]. However, while the issue of collaboration in e-marketplaces is often addressed, the design and implementation of collaboration service offerings are not yet well understood [8]. Furthermore, research shows that SMEs in general, and small firms in particular, are often reluctant to join technological-based collaboration despite this being a critical factor that often improves
innovativeness [3]. Our findings suggest a need for a combined top-down and bottom-up perspective on requirements engineering as well as the assessment and validation of pilots. This approach would support an evolutionary development of sustainable and cost-effective collaborative e-marketplaces based on the needs and requirements of a focused sector.

The local food sector has attracted increased public interest and enthusiasm. This sector is characterized by concepts such as ‘quality’ and ‘short food supply chains’. As a contrast to the conventional industrialized food sector, it mostly includes small businesses with limited marketing budgets [19, 20]. It has been argued that the success of small businesses positively affects regions socially as well as economically and adds value to the quality of life in communities [21]. The local food sector would most probably benefit from the visibility, enhanced business opportunities, interactivity and common marketing strategy provided by a collaborative e-marketplace. In addition to this, a collaborative e-marketplace may add value to a specific community by facilitating information about and the commerce of local food products. Combining these obvious benefits with public enthusiasm, a collaborative e-marketplace for local food producers may be assumed to be successful by definition. However, a previous study performed by us indicates that it is difficult to initiate collaborative activities with other business partners in real life. This situation constitutes a challenge for engaging local food producers also in a collaborative e-marketplace [22].

1.1 The case study

Our case study is part of an ongoing three-year research project (2008-2011) supported by the Swedish Agency for Innovation Systems (VINNOVA³). The overall aim of the project is to analyse, design, implement and evaluate models of e-marketplaces catering for locally produced food products. The project includes 26 partners in the southern part of Sweden: 23 local food companies, one wholesaler, one provisions consultant and one municipality that also acts as the customer part. All partners participate in the development process of the e-marketplace and are also available for interviews, group discussions and observations of their daily work.

Due to a growing public interest, municipalities, stores and restaurants have expressed the need to introduce a wider selection of locally produced food in

³ VINNOVA home page: http://www.vinnova.se/en/
their stock. However, the customers claim that they do not have an adequate overview of the local producers and the full range of food products that are offered. At the same time, individual producers lack capacity to deliver the amount of food that is required on their own. Collaboration between producers seems therefore to be necessary, partly so that they can present themselves as a united group and partly so that they can deliver a sufficient amount of products. The following phases of the case study have been conducted:

**Phase 1.** Identification of the main components and their dependencies as defined in our case study (see Figure 1);
**Phase 2.** Selection of producers and customers as the first stakeholders to be supported;
**Phase 3.** Design and implementation of a web-portal as the first pilot interface (Pilot I);
**Phase 4.** Collecting empirical data using Pilot I;
**Phase 5.** Analysing the data to identify barriers and drivers related to Pilot I (as reported in section 4 of this paper);
**Phase 6.** Assessment of Pilot I and Design of Pilot II (see section 5 of this paper).

Figure 1 gives the generic architecture of an e-marketplace and captures the main components and stakeholders related to the case study.

![Figure 1: Main components of an e-marketplace.](image-url)
The research questions and findings that have been partly elaborated so far include:

- What are the crucial explicit and implicit issues supporting collaboration through e-marketplaces?
- How should an e-marketplace be designed and maintained to foster a trustworthy collaboration in a potentially competitive market?

Pilot I exploits the mechanisms of an open platform, and uses a bottom up approach to join relevant networks. However, our assessments indicate that most of the collaborative activities did not include the whole group. Instead the collaboration was conducted within smaller clusters with like-minded producers. This situation will most probably affect the use of, and engagement in, a collaborative e-marketplace in a way that was not anticipated in the beginning. The objective with an e-marketplace in this context should be to facilitate and support trustworthy collaboration within the existing networks and also to expand the co-operation beyond these clusters. This implies a need to exploit drivers and harness barriers in the current context towards trustworthy collaboration.

In this paper we identify the key drivers and barriers of Pilot I. The aim is to facilitate the design and maintenance of trustworthy collaboration e-marketplaces containing clusters of SMEs.

Our findings of drivers to be exploited and barriers to be handled are mainly related to the fact that the present e-marketplace has open access to networks that lack mechanisms for protection and security. Furthermore, issues of investments and ownership are unclear and considered risky for the stakeholders involved. To allow for more deep investigations and understandings of collaboration in e-marketplaces, we need a stable infrastructure that clearly define ownership and access rights. Finally, we outline additional research and development investigations concerning collaboration mechanisms hosted on cloud computing infrastructures (for Pilot II).

1.2 Overview of the paper

The remaining part of the paper begins with a description of our theoretical framework (Section 2) and continues with a description of the research setting and methods (Section 3). Then, we assess the current context of collaboration, including drivers and barriers (Section 4). This is followed by
an analysis and discussion of issues that are important to consider also in the design of Pilot II of our study (Section 5). The paper concludes with a summary of our findings (Section 6).

2. **Theoretical perspective**

Supporting collaboration and cooperation with computer-based technologies has been a focus within the interdisciplinary research area of Computer Supported Cooperative Work (CSCW). The main endeavour with CSCW research is to understand the requirements of cooperative work to better support it with computer-based technologies [23].

Within CSCW, cooperative work is not defined by formal organizational boundaries or structures, but by actual cooperative behaviour. This implies that cooperative work “emerges in response to the requirements and constraints of the transformation process and the social environment on one hand and the limitations of the technical and human resources available on the other” [24, p. 352].

CSCW research has highlighted several important aspects of the nature and requirements of cooperative work. In general, it has been shown that supporting collaboration is a complex issue that requires more than the improvement of information access and communication [25, 26]. Therefore, CSCW research highlights the importance of understanding the social nature and actual requirements of collaborative settings. In the current study, this is even more so the case since the development of a collaborative e-marketplace implies a need also for a bottom-up perspective based on the needs and requirements of the local food sector, as previously discussed. Furthermore, research in CSCW has shown that human actions are both situated and flexible according to the social and physical conditions that are in place [27]. As a response to this finding, collaborative settings are most often explored through ethnographic studies. [28].

3. **Research setting and method**

The findings presented in this paper are based on the collection of empirical data found during Pilot I (phase 4) of the case study.

The local food businesses included in this study are relatively small and they produce a small amount of products. The products vary from vegetables and
milk to spices and herbs and in some cases the business includes a farm shop. The majority of the participants are family businesses and most of them do not have any employees except the owners.

The methodology for the collection of empirical data followed an iterative process that is often used in ethnographic studies. This implies that analysis is conducted through every stage of the research procedure and thus sharpens the focus of the data collection. The aim when analysing data was to identify and categorise common activities and/or issues which can explain how collaboration is accomplished in the examined context of local food producers. Therefore, the collected data was indexed according to which activity or issue it illustrated.

The methods used to collect data were observations, interviews, group discussions and questionnaires. In total, four days of observations of the producers’ daily work and collaborative activities were conducted. During these studies, field notes were taken and transcribed the day after the observations were conducted. As a follow up, some 15 interviews were conducted at the participating producers’ manufacturing environment. The aim of the interviews was to enable a more detailed understanding and validation of the situation of the producers’ work environment, the collaborative context and also to fully understand the objectives and aim with the observed activities and actions. The group discussions were conducted during project meetings and they focused on opportunities with collaboration between the participating producers through an electronic marketplace.

Finally, questionnaires were distributed and collected. These questionnaires investigated the producers’ view on the issues, objectives and aims of the current networks and the collaborative activities and also sounded the development of the collaborative e-marketplace. In short, the purpose of the ethnographical approach was to identify the needs and opportunities that may empower workflows in Pilot I.

4. Current context: drivers and barriers of collaboration

Within the local food sector it is regarded necessary and important to collaborate, in particular in relation to business and marketing activities. Furthermore, since many producers manufacture and sell products on a small
scale, there is an urgent need for co-transportation of products. However, while many producers consider collaboration as important for their business, they also state that they are not engaged in many collaborative activities. In addition to this, while many producers state that they do not collaborate, the observations show that some collaborative activities are in progress even so. In short, in spite of an articulated need of and belief in collaboration activities, certain barriers seem to be present.

In the following, we present the current context with a focus on drivers and barriers of collaboration and the producers’ future vision regarding interaction through collaborative e-marketplaces.

4.1 Networks and associations: a clash of identities

In the studied region, initiatives have been made by different organizations to bring together small local food producers in networks. These open networks are constructed and defined either by the products, such as the network of jam producers, or by the area/region to which the food producers belong. According to the questionnaires, the most important reasons for joining these open networks were:

- To broaden contacts;
- meet like-minded people;
- exchange experiences;
- joint marketing efforts;
- other benefits of joint efforts.

However, there is a slight difference between small and medium businesses. The smallest businesses join the networks to learn and make social contacts for the company and to make personal contacts for the owners of the business. In contrast, one of the larger producers stated that the reasons to join networks are “to sell, to inspire, to influence”, implying that the main objective is to affect the networks and find business opportunities. This diversity of interests have, in some cases, resulted in clustered active networks in which the participants are invited to different activities in order to exchange knowledge, information and experiences. In other cases, the networks have become more passive and are considered by the producers as merely paper products. In fact, the diversity of interests within these networks may be the reason that not all networks lead to deepened collaboration between producers. For example, while a small producer expressed during
the interview that “we are what we are, and that is what we want to be”, a larger producer stated “In order to reach our business goal, we can’t collaborate with producers that has a slower pace”. While the diversity between producers is illustrated in these comments, it seems that most producers join these open networks in order to make others aware of their existence and find like-minded producers to make contacts with.

Making contacts with like-minded producers have, in several cases, resulted in new and more focused networks and a closer collaboration initiated by the producers themselves. For example, during our study we observed that a network of jam producers was initiated. The network recently established a homemade joint trademark called “authentic jam”. This trademark has established rules and specifications of how “real” or “authentic” jam should be produced. In particular, they have decided against the use of industrial pectin in the products, to use copper pots and make the jam on a small scale for a more natural and “authentic” jam production. Furthermore, the trademark sells jam products compiled by jam producers participating in the network. The producers are required to pass an examination to verify their knowledge about “authentic” jam production. After examination and selection, these producers make a jam that is sold exclusively through the trademark. In return, the jam producer is shown with picture and a notice about their regular business at the “authentic jam” product label.

The overall objective with the jam network is to increase the interest for jam production and to disseminate information about the importance of craftsman-like production and its impact on the product’s quality. This is a common marketing strategy that is equally important for the individual businesses that want to present their products as high quality products. However, by creating a focused network with like-minded producers, producers that have another definition of high-quality jam are excluded. A producer that currently is not included in the “authentic jam” trademark expressed that “the most important ingredient is to use first class berries”. Clearly, all strive for producing high-quality products, but have different views and definitions.

The above situation is only one example of contradicting views in the local food sector. In fact, several different definitions seem to be used. First, what qualifies as locally produced food varies, particularly for products that contain primary ingredients collected from foreign countries. Second,
“quality” is defined differently and what may be considered as “real” and “authentic” also depends on the producers’ subjective view. Third, what is an additive or what is not is defined differently and, what is more, there is a plethora of laws, rules and conventions about what is allowed to be added to a high-quality, locally produced authentic product. Fourth, Small-scale production is considered to be a craftsman-driven production, but there are divergent views on how small the production scale must be to be considered as small. For example, one producer stated that “it is handicraft, and therefore it is not possible to force it [the production] too far”. Finally, it is also important that the personal chemistry between the producers is working.

To conclude, the diverse definitions and contradicting interests between the food producers unveil a “clash of identities” within the local food sector in our case study.

4.2 Collaborative activities: enhancing business opportunities while avoiding clashes

The identified collaborative activities between producers are of two kinds: Collaboration concerning the producers’ core businesses and collaboration concerning add-on businesses, i.e. activities that are conducted with the purpose to enhance the core business. There seems to be more collaboration regarding the add-on business activities than regarding the core businesses.

The core business of local food producers is the production of food products. This includes purchasing, cultivating or breeding depending on the business’ primary product. This also includes the actual manufacturing process and the process by which the products reach the customer. Currently, collaborative activities are most often focused on the exchange of primary products between the producers, the purchase of packaging material when two or more producers jointly order packages for their products, and the joint transportation of products from two or more of the businesses to the customer. During the study, it was shown that collaborative activities are few regarding the core business although some producers have discussed future possibilities. Many producers stated that collaboration concerning the core business is possible only with selective producers, that is, those producers that have the same business goals, objectives and interests. Furthermore, it is important that the producers have a common view on the core concepts “authentic”, “real”, “genuine”, “locally produced” and “small scale”; i.e. concepts that also constitute and describe each company’s core business.
spite of these difficulties, it seems that the producers collaborate on their add-on businesses to a greater extent.

Add-on businesses are very common in the local food sector and they seem to be of great importance to the local food producers. For example, many producers have small farm shops in which they sell their own products but also other producers’ products. One producer said that “People really want to come to a farm shop and get the product from the direct source. In the meantime they buy other products. The more products, the more attractive it is to go to the farm shop”. Many producers also arrange courses on their particular handicraft and organise events as an add-on business, such as theme days on a particular subject, food tasting, guided tours and markets. In some cases, collaborative activities were conducted on both the core business and the add-on business. For example, one producer stated that “Our sea buckthorn is used by a local bakery that bakes a bread of this, which we then sell at our farm shop”. In fact, many producers consider collaborative activities as essentially important in order to enhance business opportunities. Three main reasons have been identified:

- The opportunity to expand the network;
- the possibility to co-develop products and ideas;
- increased competitiveness that allow businesses to attract customers by offering a greater selection of products and/or services.

In summary: shared values and core definitions are the main pillars of the collaboration of working core businesses. However, through add-on business collaboration, the producers enhance the business opportunities while avoiding the clashes.

4.3 Collaborative e-marketplaces enabled by trusted interaction

Our case study shows ongoing discussions among stakeholders regarding the Internet as a new arena for marketing and business activities. At present, all producers have websites, some more advanced than others. At the same time, potential customers in the region, such as municipalities, the county council, restaurants and shops, have expressed a need for a digitally available collective and comprehensive overview of the producers in the region. A portal-like website has been discussed as one possibility to accommodate this need. In fact, during the interviews it was revealed that the producers also need a collective overview of the producers within the region. Several
producers have also expressed the need for a digital platform for interaction and collaboration as well as a joint marketplace as an additional selling channel. To facilitate these needs, the development of a collaborative e-marketplace has therefore been discussed within the project as a possible solution. However, the producers and other market participants have different opinions, depending on their respective contexts, on what is useful to incorporate in the e-marketplace. Their opinion might depend on if they have certain certificates and/or belong to specific networks.

During the interviews, several issues regarding the increased interest in the local food sector was raised. In particular, the design of the marketplaces was discussed. An essential problem that has been put forward is the increasing amount of impostors that profit on the general interest for locally produced food products. In fact, many of the producers have witnessed people that do not even have businesses, but still sell products which they falsely market as more genuine and authentic than they really are. These ‘unreliable’ people have unfortunately made the producers suspicious of new and unfamiliar businesses. One producer stated that “It is dangerous to present oneself as something you are not. It is hard enough to be a small producer.” This situation has led to prejudices among producers based on rumours. Therefore, in order to enable trusted interaction, a common opinion is that the e-marketplace must have restrictions on which businesses that are allowed to join and that it must be possible to ensure that those restrictions are enforced.

5. Discussion: collaborative e-marketplaces containing clusters of SMEs

From the assessments of phase 5 of the case study, we have identified the apparent paradox of drivers and barriers in networks designed for collaboration. On the one hand it is considered important to collaborate, but on the other hand most producers find it difficult to initiate collaborative activities. From findings in our study it is quite obvious that the main reason for the deficiency of collaborative activities is diverse and contradicting views on some key elements such as business goals, the definitions on the core concepts describing the products and the production, personal chemistry and divergent interests. The current situation has created clusters of SMEs, and between the clusters there is a clash of identities with divergent views and opinions.
Networks designed for collaboration, such as a collaborative e-marketplace, has to support the drivers in the current context. However, to harness identified barriers and to expand the co-operation beyond these clusters, there is a need to define suitable rules of engagement. We argue that our findings of drivers and barriers are not unique but quite common when setting up similar environments.

In the following, we discuss important aspects in the current context of collaboration for the design of Pilot II, which also need to be considered in the design and maintenance of collaborative e-marketplaces that contain clusters of SMEs.

5.1 Clusters of individuals and organizations

One of the drivers for joining networks and associations is to learn from other producers and exchange experiences. The producers join the networks to find like-minded producers for closer collaboration on agreed activities. At the same time, while many producers consider collaboration as important for their business, they also state that they do not engage in many collaborative activities.

The current context reveals a collaborative behaviour that cannot entirely be explained and understood based on organizational requirements and business motivations. It seems that the producers currently collaborate with those considered as friends on a personal level rather than focusing on a professional relation concerning business activities. We argue that the separation of concerns between social networks and business networks is important in the development towards sustainable collaboration beyond clusters.

We suggest that a collaboration e-marketplace should support the drivers of current network activities as basic services, such as the exchange of information, experiences and knowledge.

In the studied context, it may be possible to soften some of the clashes by making the professional part visible and show actual facts about the products and producers. This may lead to new and more professional and productive relations for collaboration, connected to business activities instead of to individuals.
5.2 Common ground beyond clusters

In spite of articulated difficulties in initiating collaboration, our study showed that some collaborative activities actually occurred. In particular, collaboration regarding add-on businesses was common. However, only a few collaborative activities regarding the core business processes were identified. This implies that collaboration is possible despite the clashes and the tendency to cluster. Clearly, the producers have created a common ground based on more or less silent agreements of relevant add-on business activities. Common ground refers to “a process of communicating, testing, updating, tailoring, and repairing mutual understandings” [29, p.146]. The creation of a common ground is also crucial when it comes to contract-based collaboration, which is one of the main components of an e-marketplace [30].

We suggest that a collaborative e-marketplace must facilitate the requirements of support services, which may be drawn from current collaborative activities that are already established on a common ground. In this respect, the design process of collaborative e-marketplaces for clusters of SMEs needs to identify and facilitate agreements upon:

- The common ground of the participating SMEs beyond the clusters;
- useful support services.

Important to note is that the common ground also changes with the performance of collaborative activities [29]. Therefore, it is essential that a collaborative e-marketplace is dynamic and flexible for the development of new support services due to the evolving requirements for collaborative activities.

5.3 Trustworthiness and governance

In the present study, the producers are sceptical and dubious of a collaborative e-marketplace despite its beneficial factors for competitiveness. The main reason seems to be the risk of presenting themselves as allied with, for example, the impostors that have increased in the real-life marketplaces.

Trustworthiness is thus a key requirement of sustainable e-marketplaces. Trustworthiness is based on human assessments but could be enabled by engineering principles taking into account the concerns (barriers) held by the users [31, 32]. Restricting the e-marketplace by only allowing proper
producers may increase the trustworthiness of the e-marketplace as a whole. For example, to become a qualified member of the e-marketplace might entail a screening process of participants as well as the signing of contractual agreements [33].

We argue that the maintenance of a collaborative e-marketplace needs to identify and facilitate agreement upon:

- trustworthy behaviour;
- rules of monitoring and enforcement.

However, our current test bed (Pilot I) is based on a research and design context without mechanisms for governance. Therefore, we claim that the following two important barriers also have to be addressed:

- Identification of owners;
- costs of ownership and participation.

To not resolve these barriers will make it difficult (even impossible) to trustworthily address the other requirements. For example, it has been argued that engaging in e-marketplaces may involve significant costs for participants due to the investment in hardware, software and employee training [10]. Reasonably, this also has implications for the owners of the collaborative e-marketplace, who in turn must charge the participants. In that case, it is of the outmost importance that the collaborative e-marketplace provides useful and valuable support services, which make participation worth the cost.

Our suggestion is that an external authority controls and guarantees that the included producers are serious businesses with valid certifications. An external authority might increase the trustworthiness by providing high information quality and information security [34]. Several external authorities may be engaged to harness different barriers towards trustworthy collaboration. For example, trusted trade associations may be useful as sponsors or facilitators of trustworthiness [4]. External control may also dissolve some of the rumours that circulate in the current context.

5.4 Future work
To sum up, the current context shows important aspects that must be agreed upon by the stakeholders that initiate a collaborative e-marketplace. To take
full advantage of the drivers and to tackle the barriers in a fruitful way, there is a need for a flexible infrastructure that enable structured requirements, contractual agreements and validations of proposed collaboration services.

During Phase 6, which is the design and implementation of Pilot II, we will take advantage of recent developments in cloud computing [35] and set up an infrastructure for collaboration between SMEs using Platform as a Service (Paas), similar to Amazon’s Amazon Elastic Compute Cloud⁴ (Amazon EC2). The main components of the outsourced part of Figure 1 are given in Figure 2.

![Figure 2: The main components of outsourced EC2 components.](image)

The EC2 support is accessed via the ElasticIP. The primary EC2 components are: The Load Balancer, the Monitoring and Amazon S3⁵, the latter an online storage web service designed to make web-scale computing easier for developers. By applying this experimental environment we will enable the design, validation, implementation and user assessments of developed services in a cost efficient and sustainable framework. Through this, our aim is to gain validated experiences that allow us to identify the mechanisms that support development and govern collaboration services.

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⁴ Amazon home page: http://aws.amazon.com/ec2/
⁵ http://aws.amazon.com/s3/
6. Conclusions

In this paper we have explored a current context of collaboration between small local food producers. The aim of the study was to identify the drivers and barriers to support design and maintenance of collaborative e-marketplaces for clusters of SMEs. From our findings and analysis we conclude that collaborative e-marketplaces that support drivers for collaboration and harnessing barriers should build on agreements on:

- the common ground of the participating SMEs beyond the clusters;
- useful basic services and support services;
- trustworthy behaviour;
- rules of monitoring and enforcement.

In addition to this, we claim that two important barriers remain to be harnessed. Those are the identification of owners and the costs of ownership and participation. Not resolving these barriers will make it difficult (even impossible) to address the other requirements in a useful way. We have also outlined Pilot II intended to structure further investigations.

Acknowledgements

This study is sponsored by the Swedish Agency for Innovation Systems. The authors would like to thank the 26 partners in this project for their time and effort. We also wish to extend our warmest gratitude to Bo Helgeson for reading, discussing and giving comments on this paper.

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This thesis reports a research effort that comprises six papers and a cover paper. In essence, the thesis contributes to the understanding of collaborative settings by introducing the perspective of ‘places of collaboration’. This perspective is particularly important when designing computer-based technologies that support collaborative settings.

The starting point and overall research aim is to understand people’s efforts to configure their current context for the purposes of collaboration. The cover paper of the thesis comprises a theoretical reflection and examination of four collaborative settings. The settings have been studied in situ through ethnographic inquiry and the results are reported in the six papers enclosed in the thesis. In my theoretical reflection, the concepts of ‘place’, ‘space’ and ‘boundary objects’ are central.

The studies revealed that people’s efforts to configure the current context create and reflect a ‘place of collaboration’. During this configuration, the space and the use of materiality in this space are important parts in the creation of a place of collaboration. In addition, people configure collaborative contexts of intersecting practices by creating boundary objects. Boundary objects serve as mediators in a place-making process for the integration of places into a ‘place of collaboration’ for several practices. What is more, the dynamics of a place of collaboration may affect changes in existing modes of working and in computer-based tools that have been introduced into the workplace. The people and practices that constitute the place will in turn reconfigure the place of collaboration, including the space and objects available due to the new circumstances.

People’s configuration of their current context reveals crucial aspects about the place of collaboration that must be considered also when designing to support this setting. However, this configuration may not necessarily equal efficiency and effectiveness, as evaluated by actors external to this context. The conclusion of this thesis is that future research and design should consider how to support people in their own effort to configure their collaborative context.

ABSTRACT

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