Participatory inquiry – Collaborative Design

Martin Johansson
Abstract
This dissertation focuses on design sessions in which users and stakeholders participate. It demonstrates how material from field studies can be used in exploratory design sessions. The emphasis is on the staging and realization of experiments with ‘possible futures’.

Using a design perspective I have worked with how field studies can contribute to design processes in which many parties collaborate. With a starting point in collaborative ‘sketching’ and creation of scenarios I have striven to create a meaningful way for design teams to adopt a practice perspective. The dissertation shows that there need not be any opposition between exploring ‘what is’ and envisioning ‘what can be’.

The increase of computer technology in everyday life and the development making information technology become an integrated part of more and more everyday products has given rise to a need to find new ways of working in the process of designing. If it was ever possible to work in an isolated way on either digital or physical technology, this is no longer the case since development requires collaboration over these borders. In the same way, IT plays an increasing significant role in people’s everyday lives. User focus and user involvement have become commonplace. This calls for new ways of organizing the design process. The present dissertation meets this problem. I have participated in four projects in which exploring users everyday practices has become a meaningful design activity and a foundation for collaboration.

The purpose of this dissertation is to shed light on the possibilities and the advantages offered by working design oriented with material from field studies. Furthermore, it strives to show how design sessions can be organized and carried out on a practical level and exemplifies with concrete projects. Special emphasis is given to the creation of and the inquiry into design material and the development and use of design games.
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Introduction
This dissertation explores how designers can assimilate and make use of a social practice perspective in the process of designing for a use context. This project places itself in an emerging field on the borders between Computer Supported Collaborative Work (CSCW) and Participatory Design (PD). I am interested in design, more particularly the form of design that changes existing practices and yet preserves what users value as important. It is suggested here that ethnographic material can be made into a sketching material for collaborative design sessions. The approach that is described here uses ethnographic material as boundary objects with the use of which a group of designers can collaborate.

The dissertation is based on four themes: “Searching for design openings”, which brings up how design is practiced and described within research today and it presents a view of what design informed by ethnography can be. “With a flair for practice” deals with what and how design can learn from ethnographic practices. It discusses how ethnography can be useful in design situations. The third theme, “Co-authoring”, is about how sketching and scenario building can be carried out as collaborative activities involving both exploration of existing use domains and the exploration of possible future ones. The fourth and final theme is “Games as world constructions”. This section goes into detail about how design games can be set up to facilitate collaboration and how the design project can be based on existing practices.

Instead of repeating the need for work practice in design I will present a suggestion as to how work practice can play a role in the design process. There is a need for a new system thinking in design, one which takes as its starting point the activities that will take place and integrates technological and architectural aspects. If the work place is an office, a truck cabin, a process industry, or not a workplace at all but a home environment is irrelevant: technology exists at all of these places and its how it is designed changes the activity.
My interest is in conceptual design of (information) technology. I entered the field of CSCW when there was an ongoing and intensive debate about the value of ethnography informing design. As I became more and more convinced that the relevance was high, I found very few suggestions or descriptions of how ethnography can inform design; neither was I convinced of the strength of such suggestions. My basic training followed the CSCW tradition, and I had no “design” background. From design literature I learned that ethnography was not necessary for designing. This may sound trivial but it made me start to think about what ethnography could contribute with from a design perspective. In my initial attempts it felt like fitting square blocks into round holes. Convinced about the strength of ethnographic work, however, I started to make the blocks less square and the holes somewhat larger. Ethnographic exploration must be made a meaningful part of the design process.

The title "Participatory inquiry – collaborative design" describes the approach that I have come to adopt in establishing a relation between ethnography and design. Designers always need to make inquiries, and throughout my work I have striven to create a meaningful way by which design teams may adopt a social practice perspective. I have been working with preparation and organization of design sessions in which the design process sets the stage for future use (practices) and ethnographic field material is used as design material.

Below I give a summary of relevant research that is closely connected to my work. This part is divided into three sub-sections: “Design informed by ethnography”, “Collaborative Design” and “The justification for ethnography in design - and why it is still interesting”. The aim here is to show how my reading of the relevant literature provides arguments for why ethnography can be useful in collaborative design.
Design informed by ethnography

The problem in this is that the instances – descriptions of work – do not “speak” to design. (Crabtree, 2001 p.218)

In the last decade or two ethnographic studies has become an established practice within IT-design research. It all started with a reaction to the oversimplification of work activity that some system developers at the time made. The response was in-depth studies of work. Studies of control rooms informed about how physical things were used for communication (Hughes et al, 1994, Mackay et al, 1998) and about how ‘overhearing’ was a resource for collaboration (Heat and Luff, 2000). Evaluative studies of the use of implemented systems showed how actions are situated (Suchman, 1987) and how work practitioners order their work in ways they find suitable even though these may contradict the workflow planning built in to a system (Bowers et al, 1995). At this time these studies fulfilled the purpose of helping system designers “turn to the social” (Grudin, 1990). What they did not do was provide help to design better, but pointed out problems. The importance of practice studies was made very explicit but there was no suggestion as to how to bring about integration between the studies and design process. This gave rise to some criticism, e.g. Plowman et al makes a colorful and critical summary of the terms used to describe the relation between ethnography and design: ‘Typical of this reticence are claims to offer only “insights” (Heat & Luff, 1992), “directions” (Filippi & Thereau, 1993), “input” (Gronbeck et al, 1992), “suggestions” (Luff et al., 1992), “implications” (Beck & Bellotti, 1993) and “options” (Egger & Wagner, 1993) for design’ (Plowman et al, 1995 p.315). More recent work within CSCW and PD has also started to explore ways of letting ethnography inform design, and making these ways explicit.

Holtzblatt and Jones (1993) Presented “Contextual inquiry” as an early attempt to include ethnographic studies in IT-design projects. Their contribution set up guidelines for designers working with ethnographic field material. Their approach strives to create
requirements that can be worked into the existing practice of IT designers (Beyer and Holtzblatt, 1998). This approach has been adopted by, for example, Kensing and Simonsen (1997), who suggested development of the technique and presented case studies from which others could learn.

Button and Dourish suggest “Technomethodology” as a way of linking ethnomethodology and technology development (Button and Dourish, 1996). In a theoretical exploration of what possibilities there are for linking ethnomethodology and design they found three categories: Learning from the ethnomethodologist, Learning from ethnomethodological accounts, and Learning from ethnomethodology. According to Button and Dourish, the history of CSCW has followed a pattern in which most studies have taken the form of design critique, and in an effort to make a move towards a design practice they advocate “learning from ethnomethodology”. Dourish and Button (1998) have not “been attempting to formulate a design method by which sociologists and computer scientists can work together on design problems. Rather, [they] have sought to develop a form of technological design which is fundamentally grounded in the understandings that sociological perspectives employ.” Technomethodology “argues that the most fruitful place to forge these relationships is at a foundational level, one that attempts to take sociological insights into the heart of the process and fabric of design” (Dourish, 2001). The literature on Technomethodology takes the form of manifestos in which the practical issues of the actual work are not investigated. (An extended discussion of this theme is presented in the paper “Exploring the future”).

Using an industrial R & D standpoint Anderson points out that ethnography has all too often been misunderstood as a data-collection technique. Instead, he recognizes the “analytical aspects” of ethnography (Anderson, 1994 p.151). In a more recent work he suggests “Practical sociology” as a “real engineering discipline” (Anderson, 2000). Anderson points out that for sociology to have a real impact on design projects it must be “legitimized” and “sanctioned” in the development process, and he urges that
practical sociology should be seen in relation to the existing professions and practices.

One of the groups advocating ethnography in CSCW during the last two decades has been the Lancaster Computing Department. In an article from 1994 one can read, “the prime objective is not so much ethnography as such, but ethnography as a means of uncovering the ‘real world’ character of work, and it is by this test that ethnography needs to be judged in system design” (Hughes et al 1994). This group has typically argued for field studies carried out alongside system development (concurrent ethnography, Hughes et al 1994), where the ethnographer informs the design team. A different approach is presented in Hughes et al (2000), where the “Developers NotePad” (DNP) makes accounts available to designers. The DNP is a digital notepad that organizes the ethnographer’s field notes: “The DNP thereby makes the detailed ethnographic accounts of the application domain continuously available for inspection and re-inspection, analysis and re-analysis, by other members of the design team” (Hughes et al, 2000 p.193). What I find most interesting in this approach is that it opens for designers to analyze field material; a potential weakness of the DNP is that it does not provide any guidance in how the field material can be used for design purposes.

Karasti notes that the ethnographically informed participatory design approaches that have been presented in the field limit themselves to joining ethnography and design “instead of addressing the more fundamental issues of interdisciplinary integration” (Karasti, 2001 p.44). She further observes that researchers tend to assume that there is a problem in integrating analysis of work practice and design while her workshops have shown that practitioners do this without any difficulty (Karasti, 2001 p.110). In her own contribution her aim is to “create possibilities for and to facilitate direct multiparty collaboration between practitioners, designers, and fieldworker/researcher” (Karasti, 2001 p.37). Karasti uses video collages to enable work practitioners partaking in workshops to alternate between being close and analytically distant to the existing practice: “The analytic
distance allows the practitioners to explore such aspects of everyday work that have previously remained invisible due to their familiarity and taken-for-grantedness” (Karasti, 2001 p.109). “Analytic distance allows the practitioners to become informed critics and visionaries of technological possibilities and restrictions on their work” (Karasti, 2001 p.110).

A research group in this field worked actively for twenty years at Xerox Parc. The researchers were known as the Work Practice and Technology group and were lead by Lucy Suchman. The strength of this group was they were dedicated to ethnography and combined this with participatory design. Suchman has questioned intelligent technology as a way of dealing with ‘difficult-to-use’ experiences (Suchman, 1987). In a project focusing on filing systems the group used design interventions as a way of exploring technological possibilities at the same time as the group learned about the way in which the files were used (Suchman et al 1999). The group also worked with prototypes and mock-ups (inspired by Ehn, 1988) as a way of engaging in the practice to refine concepts (Suchman et al 1999).

In an effort to make ethnography useful in Participatory design Crabtree suggests how an ethnographer can work within a design team (Crabtree, 2001). The suggestion is that a trained ethnographer should make a study and then take part in the design work. When designers raise questions that the ethnographer can relate to his field study, the ethnographer tells a “story” based on what has been observed in the field. The story is adjusted to what the designers are currently working on. This approach differs from those approaches that hand over “implications” to designers as a starting point. Here Crabtree suggests that it is the design process that “drives” the process of exploration.

The pattern approach (Martin et al, 2001, Erikson, 2000) builds on Christopher Alexander’s work within architecture. Recently, many computer system developers have adopted pattern thinking as an extension of object-orientation: “The idea is to first find recurrent
phenomena and to make these patterns available to designers’ (Martin et al, 2001). These patterns are drawn out of accounts. A collection of patterns may be more easily accessible to designers than the accounts themselves. The accounts within a pattern are not limited to only one author; instead it is claimed that the pattern becomes better the more accounts and more authors there are. Each pattern aims to shed light upon how different artifacts are used in specific settings. The pattern approach stimulates the development of a pattern library in which earlier studies can be a resource for future projects. It is up to the designers to see possible similarities to what they develop, and make use of the resource. When a developer finds a suitable pattern, there is a set of ethnographical examples showing the benefits and shortcomings of artifacts used in different contexts.

Co-realisation, a different approach, combines participatory design with ethnomethodology. It strives to grasp “the ‘lived’ reality of being a user of a new system” (Hartswood et al 2002 p.12). The approach stresses that IT designers must become ‘members’ of the studied practice and work together with the users whose workplace is being re-specified as well as facilitate the use of the technology which is being introduced. The facilitators assist in “grafting” new technologies in a future working culture (Büscher et al 2000 p.189). The perspective on ‘what is designed’ is the use situation rather than the products themselves. This makes it possible for the co-realisation team to work with ‘off-the-shelf’ products (since they are designing the use situation, and not the products as such). In this approach the work practitioners are not only informants but also partakers in the design process.

At Malmö University School of Arts and Communication, the researchers have a long tradition within participatory design and user involvement. In the ’80s, Ehn (1988) was one of the figures in building up the Scandinavian design tradition. Collaboration with work practitioners and unions created the basis for democratic design, that later became one of the fundaments for the Participatory Design field. User involvement enabled the development of a special kind of field studies that is much more
design-oriented than traditional ethnographic studies. The use of mock-ups, prototypes (Ehn, 1988), scenarios (Binder, 1999) and drama (Brandt and Grunnet, 2000) became a way of envisioning future practices in collaboration with work practitioners.

**Collaborative design**

“Creative collaboration is perhaps the main challenge of our time.”

*(Jones, J. C., 1988 p.224)*

There are different reasons for doing design work collaboratively. During the '80s “democratic design” became a way of allowing people on the work floor to take part in decision making in the design process. The “Scandinavian tradition” advocated a greater user focus as an ideological stance. In Scandinavia in particular the labor unions have played a vital role in this work (see Ehn, 1988). Another, perhaps more pragmatic, reason for collaborative design is the acknowledgment that the design process is usually collaborative. Different areas of expertise are required in any major design project.

In the collaborative design research community the focus is on the problem of communication among different stakeholders. Communication is essential for all collaborative work, and when the participants in the design project have different backgrounds and come from different professional contexts it is necessary to develop ways to communicate. Wittgenstein’s notion of “language games” has been used as a way of describing and dealing with this problem (Ehn, 1988, Bødker, 1990). Wittgenstein used “language games” to illuminate the issue of meaning in language. According to Wittgenstein, the meaning of language is determined in its use, and the rules are different from one instance to another; what the rules are is determined by (emerges from) the practical context (Wittgenstein, 1953). Following the theories of Wittgenstein, Ehn draws the following conclusion: “However, paradoxical as it sounds, users and designers do not really have to understand each other […] As long as the language-game of design is not a nonsense activity to any participant, but a shared activity for better
understanding and good design, mutual understanding is desired but not really required. [...] The users can participate in the language game of design, because the design artifacts applied give their design activities a family resemblance with the language-game that they play in ordinary use situations.” (Ehn, 1988, p.118)

From this I argue that the design process needs to be meaningful for all participants. The material worked with in the design process should be such that all participants can relate to it.

Design is to go in dialogue with the design situation (Schön, 1983). It is to see how things could be different. To do this, designers work with different kinds of sketches, drawings, models and prototypes, and so on. The sketches do not only fill the role of presenting design suggestion, but function as experiments. Donald Schön describes how the sketches ‘talk back’ to the designers. When the architect (in Schöns example it is a student) makes a drawing she engages in ‘a conversation’ with the site she is designing. Schön describes the conversation as follows: “Each person carries out his own evolving role in the collective performance, ‘listens’ to the surprises—or, as I say, ‘back talk’—that result from earlier moves, and, responds through on-line production of new moves that give new meanings and directions to the development of the artifact” (Schön, 1987 p.31). The ‘back talk’ is generative and offers a creative resistance; the designer “can never make a move that has only the effects intended for it” and this makes him explore “unexpected problems and potentials.” (Schön, 1987 p.63) There are a few problems with this when working in a collaborative setting. As mentioned above, the process has to have meaning for all participants, and when the sketches are this central they must also make sense to all participants. In other words, the sketches mediate the design work, and the participants depend on the sketches for their collaboration. The trained designer may use a pen and a piece of paper to illustrate his ideas while other stakeholders need other kinds of design material to be able to sketch.

The design perspective in this dissertation takes as its starting point the Schönian way of regarding designing as revolving cycles
of seeing, moving and seeing. The crucial point in developing this new design practice is to create ‘conversations’ with the ‘use-context’ and to work with design artifacts carrying the resistance that the use context offers. At the same time, the design artifacts need to act as a meeting place for different kinds of expertise that are brought together for collaboration purposes. In the words of Pelle Ehn: “[Designers] must be able to deal with the following contradiction: on the one hand […] The new artifacts should be ready-to-hand in an already existing practice. On the other hand, to break down the understanding of the already existing situation and make it present-at-hand, is to make reflection about it possible, and hence to create openings for new understandings and alternative designs” (Ehn 1988, p.77). Dealing with the meeting of the existing practice and the possible ones is what collaborative design is about in this thesis.

The justification for ethnography in design – why it is still interesting

Winnie the Pooh, the teddy bear living in the forest close to Christopher Robin, comes one day to talk about Heffalumps. Without telling the others, that is Christopher and Piglet, he wonders what a Heffalump is. Later the same day Pooh decides to build a trap for Heffalumps, a design task as good as any. Pooh involves Piglet, a stakeholder who is very interested in finding out what a Heffalump is, in the design process. During a brainstorming session Pooh gets the idea of digging a hole that the Heffalump can fall into. Piglet asks for the rationale behind the idea questioning why a Heffalump would walk into a hole. Pooh elaborates on the issue and gives the following answer, “[…] the Heffalump might be walking along, humming a little song, and looking up at the sky, wondering if it would rain, and so he wouldn’t see the Very Deep Pit” (Milne, 1991 p.64). Before implementing the design, Pooh also adds the extra feature of a jar of honey to the trap “in case it already was raining” (ibid).

Looking back on the design assignment that Pooh takes on, one can wonder if Pooh might have benefited from using another design technique in addition to brainstorming. The design concept
seems like a result of a designer placing himself in the use situation. In this case, there is a bear designer "with a Very Little Brain" (Milne, 1991).

The above example taken from A.A. Milne’s famous book is as an illustration of some of the things that a designer needs to consider. Pooh skips some parts that could have proved helpful. It seems that Pooh knows too little about his target group; studying this group would have proved helpful. It also seems that he comes up with only one idea and that he is satisfied with that one. Some further exploration of possible solutions could have been useful. If Pooh were right about the Heffalumps’ daily routines, perhaps he could have invited a Heffalump in for a cup of tea to satisfy his curiosity; he did not need to catch one in a trap.

When social scientists entered the IT-design scene, they could offer criticism of assumptions made during the design process. Their criticism was based on detailed studies that showed how the ‘use domain’ was different from that conceived of by designers. Such criticism has proven to be fruitful and the IT-design field has developed considerably as a result. To reveal the “real world character of work” (Hughes et al 1994) is what Ethnography within CSCW is all about; I am confident that all ethnographers active in the CSCW-field are able to do this without problem. Ever since ethnography became established within CSCW, ‘Ethnography in Design’ has been primarily concerned with how designers can make use of the understanding of the practice that ethnographers can provide. That this topic remains interesting to debate is due to a concern for how ethnography is a part of the design process. In research papers we often read about “Implications for design”. When IT designers were criticized they wanted to know what the use domain was actually like, and what they got from ethnographers was implications for design as a light version of understanding practices.

The present dissertation offers a new view. My motivation for ethnography in design is not primarily to provide ‘understanding’ but to provide a material that can be explored (by the design team)
in a search for design openings. Opening for how things could be different Just like Pooh, the problem was not only that he knew too little about Heffalumps. He also settled with the first idea he thought of; he did not explore any other possibilities. By not using ethnography as understanding but as material for exploration, other possibilities may emerge. I argue that ‘seeds of the future’ can be found in existing practices, and that working with existing practices will provide a ‘creative resistance’ that challenges designers to envision possible futures that are different from, but still an extension of, existing practices.

Design informed by ethnography is still the best formulation I know to summarize this introduction and the dissertation as a whole. For me, design means to work in a design-oriented way, using experiments to envision possible futures. For me, ethnography is not ethnographic descriptions, accounts or any other nicely wrapped package ready to be handed over to designers, rather, it is a practice of inquiry. The research on ethnography in design that has been presented in the last few years tends to create a ‘gap’ between ethnography practice and design practice, a gap that researchers try to bridge in collaborative design sessions. Within the Participatory Design field, user involvement has developed with collaborative dramatizations and scenario-building techniques relating to the use domain. The fields CSCW and Participatory Design have in some respects become closer to each other. The approach presented here argues for a special flair for practices in collaborative authoring of possible futures. It provides a format for creating these participatory inquiry sessions where the exploration of ‘what is’ and ‘what can be’ are interwoven.
Practicing action research

Action research refers to research that takes as its starting point the problems of ‘participants within particular, local practice contexts’ (Argyris and Schön, 1996 p.86). Such research approaches have in common that the researcher ‘takes concrete action to achieve positive change’ (Brandt, 2001 p.28) and exploration of a context simultaneously. Action research is characterized by engagement in a specific problem/assignment usually originating from industry. Argyris and Schön (1996) describe action research as “organizational learning”. The involvement of industry and users in the action research process does not only provide a firm grounding in existing practice but also opens for change in core values in that practice (Messeter, 2000 p.42).

Argyris and Schön (1991) argue that a challenge for action researchers is to uphold scientific rigor. The relevance for industry etc. of action research is fundamental to the research. The appropriate rigor of action research according to Argyris and Schön consists of “three things: a way of representing research results that enhances their usability, a complementary of constructing causality, and an appropriate methodology of causal inference.” (Argyris and Schön, 1991 p.85). The research presented in this dissertation builds on projects that were designed to function as experiments. The experiments have developed and been refined in an incremental research/development process. My research builds on projects that have been carried out at the Space and Virtuality studio in Malmö. My focus throughout all the projects has been on how to make use of field studies in the design process. I have played a significant role in the setting up of all the design sessions. The projects have been planed and carried out in discussions with all participating parties. For me, the projects have been experiments in which I have been able to develop and evaluate the variations in the approach presented in this dissertation. The experiments are evaluated on the basis of how the design material comes to play in the design sessions and the outcome of the design processes in which they played a part. My research is traditional in the sense that it builds on the research of others and strives to establish a dialogue within a limited research community. In the
Scandinavian participatory design tradition, action research has been central in imposing change grounded in existing practices at work places based on democratic worker participation (Ehn, 1988, Bødker, 1990, Messeter, 2000, Brandt, 2001, Fröst, 2004). I see my work as part of this tradition.

Without rejecting the value of preformed hypotheses, participatory action research is likely to depend more on what I call “creative surprises” – new ideas that arise unexpectedly during the intervention process. (Whyte, 1991 p.97)

The research question that formed the starting point for my dissertation work was “how can ethnography inform design?” Unlike many others working with the same theme, I chose to explore the usefulness of ethnography from a designer’s point of view. From this perspective my hypothesis is that ‘ethnography can be useful when designing’. The ethnography I work with is inspired by the work practice studies frequently carried out within the CSCW tradition; these are often labeled ‘ethnography informed by ethnomethodology’. The ‘designing’ I engage in is collaborative design settings with many stakeholders, including potential/future users, below referred to as (work) practitioners. I have developed ways of turning ethnographic field material into design material; I have also developed ways of using this design material in design projects. What I came to explore in detail is how video material from ethnographic field studies of existing practices can be brought in to a design process in a format that allows a design team to explore the practice they are designing for and use the material to set up experiments/scenarios to envision and explore possible futures. As Whyte (above) has already predicted in relation to action research, my research question has developed through participation in design projects.

Working together with industry and users means that it is always “for real”, and the design material that I provide is constantly challenged to see whether it is worth working with or not. If the design material does not make sense or does not bring the process further it is left behind. The industrial partners with whom we
have worked have established ways of doing design work. We invite them to take part in another process, and if what we provide is not good they will return to these practices. I have taken part in the design discussions in all projects, suggesting framings for the assignment and presenting ideas for new design concepts. Taking an active part in the design work fills at least two purposes: It makes my role in the project valuable to the participants since it is not crucial to the design process that a researcher who only observes might not be informed about events which occur in his/her absence; and it is also a way of constantly challenging my interpretation of the design work in progress. To suggest what to do next etc. exposes my understanding of the situation; if the group does not agree with me, I will be told. (There is a difference among the participants: Developers are experienced in their role in the design process. Users are experienced in being users but do not normally take part in a design project.) Our collaboration with industry was successful. Some of the companies have been involved in more than one project in the Space studio. Two companies have placed employees in the Space studio for long periods (approximately six months). Other companies have tried out approaches within their own organizations, which were inspired by the design processes in which they have participated in the Space studio. I take these positive reactions as a clear indication that the companies that we have worked with could see the relevance of our work and the approach presented here.

For each of the projects presented here a field study of a use domain has been carried out. The studies are rather short, ranging from a few days to a couple of weeks. In all the projects in which we have been involved, the field material has been used in workshops with participants from industry and from the use domain. The research group selected interesting episodes with which to work. (These were selected by the person/people who carried out the study).

All projects have included several workshops. In the Process visions project we had three large workshops, one with process workers, one with designers working in the process industry, and
one with both process workers and designers. In the Experimental office project we arranged four workshops, three with the initial consortium of companies and potential users. A fourth workshop was held when the consortium was reorganized. The Comit project included three workshops involving industrial partners and potential users. The Atelier project arranged two workshops with students, and two aimed at the larger EU-project community. With these and all the other workshops discussed in this dissertation, fourteen large workshops took place. The number of participants has varied from 20 to 35 (the Comit project involved fewer people, approximately ten participants in each workshop), and in most workshops there was group work in which the participants were divided into two to four smaller groups. All workshops have relied on the full number of researchers in the project team. In the Process visions project and the Experimental office project I was responsible for carrying out most of the fieldwork, and it was I who made the selections of material with which we worked. In the Atelier project and the Comit project, I worked primarily as a workshop planner and facilitator.

The workshops were recorded on video and analyzed as part of the evaluation of the experiments. In describing how the experiments were set up I will go into some details of the projects. The Process visions and Atelier projects included two experiments; the Experimental office and Comit projects included one each. The experiments consisted of one or more workshops with at least two groups working separately before presenting their results. The experiments were not set up to find the ultimate video card but to elaborate in detail about what works where and when. The design material, e.g. video cards and ethnographic video was new for each project, and the format was changed from the previous one due in part to what we discovered and also to the character of the project. The description below does not strive to present any results but simply demonstrates how my research became reframed as it proceeded. Observations, results and conclusions will be presented thematically at a later point in this dissertation.
Process visions (2000-2002) is an extension of a previous project called “Beyond the control room”, where the focus was on supporting process operators in their work on a large wastewater treatment plant. In the Process visions project we looked at three process plants with different set-ups. The Process visions project focused on field studies and engaged process workers in a long-term discussion about their work.

Inspired by how “video ethnography” had been used in design project elsewhere, we wanted to involve process operators in the exploration of ethnographic video material. Collaborative analysis sessions such as interaction analysis (Jordan and Henderson, 1994) went in depth into the advantages of using video. One of the shortcomings of the video in collaborative sessions is that it is passing in its character. With a paper log one can hold a finger on a section until an opportunity to discuss it arises or before deciding if it is interesting or not. You can go through video transcripts quickly to form an overview; raw ethnographic video material is time-consuming to browse.

In the Process visions project there were two experiments. The first involved white paper cards. The video cards point into the material with time codes and each card had a still frame from the clip to which it referred. There was an empty space for annotations. What I wanted to see was if the participants would use the cards in discussions, and if the card could help participants to gain an overview of the material. The experiment confirmed that the cards could be used actively in discussions and that operators could use the cards to navigate in the material. We also made the observation that even though discussions were initiated with the design material, the operators tended to describe their work on a rather general level as opposed to staying with what was actually visible in the material. In discussions after the workshop we (the researchers) felt that the operators did not see as much of the video material as we had hoped.

The second experiment in the Process visions project was to some extent a follow-up of the first experiment. Blue video cards were
created. These contained a headline, a still frame from the video material and a short description of the event from which the still frame originated. There were no time codes. The idea was that the workshop participants should first watch an edited collage from the field study; the blue video cards were intended to function as a reminder of what had been seen. The description aimed to reduce the need for looking at a sequence a second time. In experiment one, the process operators worked with material from their own plant. This experiment showed that it was possible to work with material from unfamiliar plants. The cards in the second experiment functioned well as a means of building stories but the descriptions on the cards directed interpretation of the ethnographic material to a high degree. In this experiment the video cards were printed in color on cardboard; we observed that no annotations or changes to the text on the cards were made during any of the workshops.

**Experiment office** (June-December 2001) is a project aimed at designing technology and office space for daily use. Together with industrial partners, we explored how to design an office with a starting point in both spatial aspects and digital technology. Instead of first building the office and filling it up with appropriate technology we wanted to make this into an integrated design process involving both. The experiment set up in this project was aimed at investigating if the same cards would fill a particular function for a long period, i.e. from the early stages of defining what to design until the final conceptual sketching. The shape of the video cards was re-altered. We did not include any text on these cards (except a identification number for a video snippet), as we did not wish the text to steer interpretation. We introduced game boards. Previously the cards had lain on tables and were grouped in relation to the other cards. This time we wanted to explore what a more game-like set up could add to the process. The cards were made double-sided, and we provided holders that would make them stand upright. In the project there were three workshops in which video cards and game boards were used. Throughout the process we worked with three user representatives (those we studied as a basis for the design material) and
stakeholders from all the collaborating companies. We worked in small groups and, based on our experience from earlier attempts we decided to let all participants work with all the material (as opposed to letting only the user representatives work with the material from their own ‘use domain’).

As we predicated the video cards were valuable both in early phases and when concept ideas were to be elaborated and presented. The game boards opened for a more dynamic grouping and changing relation visualizations. With this game-like set up we observed more negotiations and discussions than in previous projects.

In October 2002 we arranged a fourth workshop in the Experimental office project. This workshop functioned partly as an introduction and an overview for a number of new participants from industry; partly it was about arranging the continued design work. In this workshop we used design games that have some resemblance the game Scrabble. Stories are built using a number of video cards. Each story is connected by at least one card on the table, creating a crossword-like pattern. This design game was first created for and tried out in another project in May 2002 (this was a consultancy project which we are not authorized to describe). One of the lessons learned from this kind of game was that ‘turn-taking’ and the playfulness (that the rules can allow) creates a ‘mode’ for experimenting and designing.

Comit (2003) (Contextualizing Mobile IT) differs from the other projects presented here. The ‘use domain’ in this case was not only the workplace; instead, the interest was the transition from the ‘work mode’ to when the working day was finished. We followed three potential users from late afternoon at work to evening at home or at a pub (Halse, 2003). Again, we worked with potential users and industrial partners. The video cards were similar to those used in the Experimental office project; only the content was new. The experiment set up aimed to give us more material about design games such as those used in the Experimental office project – both the board game and the Scrabble-like game. Like the
Experimental office project, the games provided a structure for the process. We learned that ethnographic studies functions well even when related to non-professional practices. We could again note that working with material that is only familiar to a few of the participants works well. In comparison to earlier projects we could see that the role that the potential user got, was not so much that of an ‘expert’ in the use domain as someone for whom the design was being created.

Atelier, (2002-2004) Architecture and Technologies for Inspirational Learning Environments is an EU project the object of which was to design learning environments for students. We carried out fieldwork throughout student assignments, from the initial introduction to the final presentation; this was done for two years in a row. As in the other projects, we involved the students in exploring possibilities for the learning environments of tomorrow. In this project we had the chance to both use our own approach for designing at the same time as we taught design work. We tried out new versions of the design games. In some sessions we used both physical and digital video cards. Effort was put into make the material available digitally. Tagging the video cards and providing a tag reader enables the placement of a video card to start the display of a video snippet on screen. With the technology developed by the Atelier project, we could experiment with building collages with digital video cards. This had the added benefit that the digital cards could illustrate a collage where the size of the cards could be adjusted, e.g. important cards could be large. As with a deck of playing cards, the physical video cards were still the key element for organizing the ‘individual hand’. Another result of the Atelier project was that the students constructed their own design games. During the first year of the project we made a blunder while producing the video cards by putting headlines on them. Once again we found that the headings (mis-) led the students.

In the above short descriptions of the projects I have tried to give an idea of how the projects and experiments owed much to previous ones. Argyris and Schön state that in the case of action research there is no final ending or solution (Argyris and Schön,
1996). The experimentation and further development of the approach could go on much longer. Still, these projects should provide a solid basis from which to go into detail about how video material from ethnographic field studies of existing practices can be brought in to a design process in a format that allows a design team to explore the practice they are designing for and use the material to set up experiments/scenarios to envision and explore possible futures.
Theme One – Searching for design openings

“Would you tell me, please, which way I ought to go from here? Alice asked.

‘That depends a good deal on where you want to get to,’ said the Cat.

‘I don’t much care where—’ said Alice.

‘Then it doesn’t matter which way you go,’ said the Cat.

‘--so long as I get SOMEWHERE,’ Alice added as an explanation.

‘Oh, you’re sure to do that,’ said the Cat, ‘if you only walk long enough.’”

(Carroll, 1994)

Within the scope of theme 1 I will discuss “design openings”, what these are and how one can create favorable preconditions for finding them. This theme is in part a justification of the way of working that is presented in this thesis; it is also a way of placing my work in a design research context. Design projects are not always straightforward, with neat predefined goals; like Alice in the quotation above, it is not always clear which way to go. This section provides an introduction to how one may design using an unknown outcome as a strategy.

To exemplify what I regard as a design opening I will use a short extract from a discussion from the Experimental office project. It is the second workshop in this project; a small group is talking about what the current office is like.

<table>
<thead>
<tr>
<th>Helena (Seller, potential user)</th>
<th>If this is the reception desk (pointing at the table) here it is closed, separated from the office. So when we meet our customers we take them in to the part where there are a lot of rooms for meetings. The customer never comes into our office since it looks so messy.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT-systems seller</td>
<td>It’s the same at our office at Vasagatan, where we have some of the development crew. There is a consultant area that guest workers from our</td>
</tr>
</tbody>
</table>
company can use, and then we have a customer zone. We do not want to let people into where we work.

[...]

Real estate landlord

In our office, well we sell offices, so our aim is to walk with the customer through our office to show off our product.

[...]

Helena (Seller, potential user)

Actually we should do that too. We have a really nice office, with a sea view in all directions.

[...]

Helena (Seller, potential user)

It is like an anthill, almost like a newspaper editorial office, that you are happy to show.

In the above conversation the potential user explains how her workplace works when there are visitors. The customers are not taken into the office but to meeting rooms instead. When one of the participants explains that in his company showing the office is a selling strategy this opens for an alternative way of looking at visitors in the office we are designing. The potential user recognizes that this may also be suitable for her organization. Instead of regarding the office as “messy” she now describes it as something creative that she would be happy to show. By “design opening” I mean when something makes it possible to see existing practices in new ways. As in this example, the alternative way does not become a “design opening” until it makes sense (seems relevant) to the participants. Searching for design openings is a way of looking for possible ways the current practice can evolve.

Much of what constitutes design today goes back to the notion of deductive problem solving (Simon, 1984). The area of ‘design’ has many actors: architects, engineers, city planners, system developers and others. Historically, there has been a strong
orientation within these fields toward rational production processes. 'Design' has to some extent become a way of taking (chaotic) problems and turning them into well-structured ones. The design process is regarded as a linear process with clearly defined parts, for example, within system development, the process is described in terms of a waterfall model. A simplified and generalized model could look something like this: Analysis-synthesis-evaluation. Analysis comes before synthesis, which is followed by evaluation. To take a chaotic problem and turn it into a well-structured one is, according to Simon, a question of method (Simon, 1984). From this point of view, finding ‘the problem’ is of decisive importance, and one runs the risk of coming up with the perfect solution to the wrong problem.

As a critique of deductive problem solving, Rittel and Webber presented "wicked problems" (Rittel and Webber, 1974). A “wicked problem” is described as a problem where the connection between the problem and its solution is highly unclear: “One cannot understand the problem without knowing about its context; one cannot meaningfully search for information without the orientation of a solution concept; one cannot first understand then solve” (Rittel and Webber, 1974, p.91). From this perspective, defining the problem is (part of) the problem, and what the problem is depends on how one chooses to solve it. Rittel and Webber described 'wicked problems' as a special kind of problem. Nowadays, wicked problems are rather regarded as a way of looking at problems (Lundequist, 1992). One chooses a vaguely formulated problem so that the exploration of the problem domain can steer the design process. The point of working with both the problem and the solution is that the outcome will make sense (being an answer to a meaningful problem). The designer works with “wicked problems" as a way of exploring opportunities, i.e. design openings.

There is no one way of finding design openings. As for Alice (above), different ways lead to different places. What is important is that you get – somewhere. What is lacking in deductive problem solving is the experiment. It is in the experiment that ‘design
openings’ appear. Schön describes the exploratory design process as a conversational design, making a “design move” and seeing what response (effect) it has (Schön, 1983, p.148). The idea is put on paper and the sketch “talks back” (Schön, 1983). The backtalk ensures that the designer reads the sketch and is able to see what opportunities this solution offers. In an iterative process, the designer is constantly working with new sketches (of different kinds) to find design openings leading to a meaningful problem and a solution that is adequate as a design concept.

Recent work presented by Nelson and Stolterman (2003) describes a broad design notion which strives to promote a ‘design culture’, “a new culture of inquiry and action” (Nelson and Stolterman, 2003 p.1). The authors regard design as a tradition of its own alongside science, art, technology or spirituality (ibid p.3). Relevant in this context is their distinction between ‘vision’ on the one hand and ‘intention’ on the other. Vision is described as the dominating ‘design approach’ today; it prescribes a process where the goal is known in advance. Intention is “the aiming and subsequent emergence of a desired outcome […] the outcome is not there when the process begins. Intention is not only where to go, it is also how to get there.” (ibid p.144-145). Unlike science, there is no “right’ design out there, embedded in reality and just itching to be discovered” (ibid, p.31). In the design culture argued for, the path for Alice (see above) to follow is intention. Abandoning the deductive problem-solving model does not mean that we are without any way of approaching design projects. ‘Searching for design openings’ can be formulated as an experiment where the ‘play of possibilities’ is looked upon in the light of what makes sense (in practice) today.

<table>
<thead>
<tr>
<th>What makes sense today</th>
<th>Play of possibilities</th>
</tr>
</thead>
</table>

34
In the figure above, the space between ‘what makes sense today and the ‘play of possibilities’ represents the area of exploration. The Process visions project can be used as an example. One of the things that made sense in that project was that process workers moved around on the plant. This was observed during the field studies. For IT designers, the play of possibilities included among other things mobile devices. Mobile devices and the need for moving around created a design opening (represented by a dashed line in the figure). In this particular case, the design opening was refined as the Pucketizer (Nilsson et al 2000).

To find out ‘what make sense’ we have been working with user involvement and field studies. Within the CSCW research field, ethnographic studies usually result in ‘implications for design’, something aligned with the deductive problem solving approach. If we choose to accept Rittel and Webbers criticism “one cannot first understand then solve” (Rittel and Webber, 1974, p.91) we need to work in a different way when integrating ethnography into the design process. Practice studies do not have to play a role in design, but if it is wanted it can become part of the design world and become a great resource for exploration. Practice studies can be a way of creating design material for experimentation in such a way that field study is available both to users and developers in design projects.

To explore the space between ‘what makes sense’ and the ‘play of possibilities’ one can set up a design process to structure the design work. The “Design Lab” (described in the ‘Design Lab’ and the ‘Partner Engaged Design’ papers) is tailored to each project but incorporates some basic structural aspects, e.g. ‘staging’, ‘evoking’ and ‘enacting’, that build a foundation from which to work. Staging refers to the setting-up and framing of a design project. Evoking refers to working with the material of the design situation in such a way that the practice is internalized and one can make guesses about the future. Enacting entails putting the experiment into play, an externalization of ideas about possible futures.
As Nelson and Stolterman state, an intention (as opposed to vision) can direct design work: “In the case of design intention, vision is the outcome of a process triggered by desiderata that is framed and contained by appreciative judgment (distinguishing foreground from background)” (Nelson and Stolterman, 2003 p.145). The intention steers framing (one continues to work on the things that seem interesting). To be guided by intention, helps one in ‘getting somewhere’, but as the Cat adds, Alice has to “walk long enough”, and this is true for design work too. In the Experimental office project we set up the design process so that we had three design sessions, each focusing on one of the staging-evoking-enacting aspects. In practice, the three aspects were present in all these workshops, to make the approach meaningful even in separate sessions.

Staging involves making inquiries into practices and exploring the framing of the design situation. In the Experimental office workshop that focused on staging, the assignments were set up to help the workshop participants learn to work with the material. We encouraged them to illustrate themes or interesting things in the material by using the same material they were exploring. In this way, the illustrations were not definitive descriptions but could indeed be explored further.

Evoking ideas about how things can be different requires a grasp of current practice as well as being able to see what can be changed. It constitutes seeing a varicosity of possible futures that can emerge from the current practice, something that requires
knowledge of the present. In the Experimental office project technology that was not obvious choices for offices was introduced, to allow the participants to play around with (experiment with).

Enacting could be explained as a challenging experiment where ideas are tried out in relation to existing practices. To act out a scenario either as a theater play, in miniature scale or within a computer world, are ways to find out if one’s ideas make sense when the practice is central to the story. In an Experimental office workshop, the participants created scenarios where they placed themselves in the shoes of users carrying out ‘real-life’ tasks in the office they were designing.

The notion of staging-evoking-enacting is not a sequential model for searching for design openings; rather, they are aspects that can be of value in the search process. The three aspects are interwoven; it is thus hard to imagine how things could be different if you do not know how they are right now; on the other hand, trying to find out how things are requires that you are able to imagine how they could be different. Design openings can grow out of any of these aspects. Their potential lies in the experimental character of the approach. There is a kind of openness in the format. To set up ‘staging’ as a participatory inquiry and work with the field material makes it possible to constantly find new things to consider. In combining inquiry with ‘evoking’ activities, the participants are encouraged to explore the field material as they acquire new ideas and try these out.

To create a continuity in the design lab, effort is put into carrying the results of workshops to the following ones; these results were often incorporated into the design material, e.g. in the first workshop, in the Experimental office project, the participants built ‘landscapes’ by arranging a number of images from the videos on game boards (more about this in theme 4). After the workshop we examined the landscapes and went through video recordings we had made of the group work, and we identified the different concepts on the basis of how the groups discussed and how they made the design material arrangements. From each of the three
groups’ landscapes we created a theme. The themes were the “Eye”, the “Path”, and the “Burning points”. In the second workshop we chose to take as a starting point the concepts that came out of the first design event; these were used not as static data but as design material. We made these concepts into game boards for the meeting. We had used game boards before but those had been of an abstract nature. The new game boards were of a more physical space nature although they were still a long way from an architectural plan. In this way, the workshop participants had to relate to the previous workshop in all ensuing activities and discussions. In the same way we worked with the design material so that throughout the design process it reflected previous work done. The “soft” framing that was the result, allowed the group to work with the ingredients of the Experimental office as an experiment. The design material reflected previous work; at the same time, it was sufficiently open to allow new explorations.

Theme one was all about searching for design openings as opposed to looking for problems to solve or working with a starting point in a vision. Like Alice in Alice in Wonderland there is an intention, a concerted effort to get “somewhere”. Alice, of course, has ideas about what kind of places she likes in much the same way as anyone taking part in a design project. Alice wants advice about how to get to where she wants and the Cat suggests that she should walk until she finds it. The short quotation indicates several parallels to designing: There are many ways from which to choose and one needs to allow oneself to stumble occasionally in the wrong direction. If one just engages in the exploration long enough one will uncover possibilities that make sense. A difference might be that in designing there is the risk of going back to zero whenever a place does not live up to what is wanted. Alice, on the other hand, would hardly walk back to where she started.

The Design Lab is a way of constantly re-exploring both new things and previous ideas. Searching for design openings is one of the fundamental things that makes the approach presented in this thesis different from the other approaches that strives to integrate ethnography into design. Unlike when one creates a list of
implications for a particular design, an explorative design approach which moves in the space between ‘what make sense’ and a ‘play of possibilities’ is a way of steering evolution (progression form what is) with intention. This approach is design-oriented, experimental, unlike deductive problem solving and designing for a (pre-established) vision. I will continue to discuss ethnography in design and combine a social practice perspective with an explorative design process in the next theme, ‘with a flair for practice’.
Designers have always made inquiries into the domain they are designing for. In this section I will discuss how designers can approach the ‘practices’ they work with. Ethnographers have introduced a social practice perspective to the CSCW field. They have brought a special “flair for practice”. Here I will go into some detail about what designers can learn from this perspective and how the flair can be utilized in a design setting. This section comprises four main parts. First comes my perspective on the history of how ethnography has come into collaborative design. The second part is a description of how the projects I have been involved in have been organized. The third part discusses how field material can be transformed into design material, i.e. carry a flair for practice. In the fourth part I describe how the design material have been used in design sessions and how these sessions have been set up to integrate the initial inquiries into the design work.

Since what has been called the “turn to the social” (Grudin, 1990) IT designers have striven to make their products better adjusted to what people actually do. Ethnographers have entered the field and offered their expertise in ‘translating the unknown’. Retrospectively, it seems that designers’ inquiries were never a part of the debate; the ethnographic study monopolized the role of inquiry. Designers did not stop making inquiries, they could not! Inquiries are an integral part of the design process. The problem was that the ethnographers’ contributions did not affect these inquiries, which remained unaltered. The starting point of the approach presented in this dissertation is aligned with the approaches that have been developed by IT designers turning to ethnography as a way of approaching use contexts (e.g. Kensing and Simonsen, 1997; Brun-Cottan and Wall, 1995). As I have stated previously, I envision a design process where aspects of
ethnography are integrated. I am not suggesting that designers should do ethnographies (descriptive accounts), nor do I suggest that ethnographies are what ethnographers should offer design teams. The sociological pragmatic perspective that the ethnomethodologists introduced into sociology is, I believe, one of the things that designers could learn from the ethnomethodologists and also apply in the way they work with technology development.

The participatory design field has been criticized for using ethnography as a data-collection technique and ignoring the “analytic aspects” (Anderson, 1994 p.151). The ethnography that has had greatest impact both in CSCW and PD is ‘ethnography informed by ethnomethodology’, and most of what I state here is based on this particular kind of ethnography. To provide an overview of what I call ‘a flair for practice’ I will cite other writers to show how a ‘perspective’ has been described within the ethnography in design community. Anderson (1996) and Button (2000, p.322) refer to an “analytic mentality”. Button elaborates further: “However, fieldwork that merely describes what relevant persons do may well be missing out on the constitutive practice of how they do what they do, the ‘interactional what’ of their complexes of action.” (Button, 2000 p.329). I see this as a question of making sense of what ‘they do’, putting human practice in its context. Hughes et al claim, “the purpose of an ethnographic approach is not so much to show that work is socially organized (which is rather easy) but to show how it is socially organized” (1992 p.116). A similar point is made by Crabtree who argues “ethnomethodology focuses on the working division of labor as individuals are necessarily individuals-as-part-of-a-collectivity” (Crabtree, 1998). This focuses on what people do from a social practice perspective and what effect their doing has. Forsythe goes as far as to say that “The power of ethnography as a research approach derives from use of data-gathering methods together with the philosophical stance and the conceptual structure in which they are grounded.” (Forsythe, 1999 p.129). The ‘philosophical stance’ is not explained in detail, yet it is reasonable to assume that it is similar to what Anderson (1996) and Button (2000) call an ‘analytical mentality’. These more or less vague
descriptions of what ethnography is good for indicate some of what designers can gain from ethnography.

The fieldwork done in the projects presented in this dissertation have been extensively influenced by the work on ‘video ethnography’ (Blomberg et al 1993, Suchman and Trigg, 1991) done in the PD and CSCW community. Ethnographers’ rationale for using video cameras in a study is that it makes it possible to see the same activities over and over again. A second point is that it makes it possible to invite people who did not take part in the study to look at (and analyze) certain episodes. There have been different approaches to how to use video cameras. Some ethnographers place a video camera in such a way that it should not disturb the activities taking place (this approach is often labeled “fly on the wall”; see, for example, Walz et al 1993). Others work with more “dogma-like” filming using hand-held cameras. Depending on which approach is chosen; different kinds of material are produced.

In the next few paragraphs my starting point is the projects I have taken part in. I describe how I worked with field studies and how my inquiry has become an integrated part of the design work. Field studies in design project are normally shorter than research studies in sociology etc., and in the projects I have taken part in we have deliberately made the video cameras present as part of creating a scenario in which it is obvious that we have started the design process. Making the persons filmed talk aloud about what they are doing while performing a task makes the video much more easy to get into. In the recording situation, the practitioner also gets a chance to reflect on what he is doing. The nature of the situation is similar to that of story building, and the practitioners and the persons in the design team are acting. We are there to explore the practice; we are not there to make a description of how work is done (when we are not there). This will be explored further under Theme 3 “Co-authoring”.

Once a field study is complete, producing a design material is still a long way off. Usually I start with making a content log of all the
video material brought home from the study. On a piece of paper we write down what happens every other minute; this makes the material easier to navigate. The next step is to find interesting episodes or activities. We are not looking for problems to solve but sequences that say something about the practice, the place, the organization etc. The basic principle we adopt from ethnography when entering a design exploration is to “maintain faithfulness to the phenomenon” (Crabtree, 1998; Hughes et al, 1994).

At this point in the design process those who have been studied are actively involved. In one case, we edited a summary of what happened around a certain activity and showed this to all those who were visible on the tape. They reacted to some things because they did not perceive them as part of the story, and explained that some other things should have been there. In another case, we created video cards with references to the video material and arranged a workshop where the process workers we had studied created stories with the material (this is described in the “Exploring the future” and the “Between estrangement and familiarization” papers). A number of themes derived from this workshop: ‘meetings on the plant’, ‘rhythms and tempo’ and ‘machines and things’. With these themes in mind we went back to the field material and selected new sequences (with the aid of the log) and created new design material. The ‘meetings on the plant’ became a new set of video cards, the ‘Rhythm and tempo’ theme was transformed into a collage in a small booklet, and ‘Machines and things’ became a collection of pictures of things that exist in the process industry environment. This material was later used in two workshops with process operators and process industry designers.

As designers one looks at the existing practice for the purpose of initiating change, and what one wants to see is design openings and the ‘seeds of the future’, i.e. well-known things and practices that are just waiting to be noticed. Instead of working with descriptions of practices created by professional ethnographers I have chosen to work with short video snippets, fragments from the field study. The fragments are gathered from video recordings
made during the field studies. The snippets are not intended to give a complete picture of the practice, but glimpses of practices that seem to be important to the practitioners or are interesting for the design project as such. Buur, Binder and Brandt have created video portraits and point out that they did not go “into personal matters, but simply sought to capture the landscape, the places, and the kind of awareness that seemed to be associated with being there” (Buur et al. 2000). The video portraits have been a guiding format in creating the video fragments. The video portraits are much more ‘complete’ (as a story) while the fragments I use are mere glimpses with duration of a single ‘action’. It is essential that the portraits and fragments can withstand a confrontation with the practitioners. It is not a question of validating correctness, but establishing whether or not this is something that should be introduced into the design process.

The field material that has been available during the design sessions comprised a limited selection of material gathered during the study. Here I will present how design material created from field material can encourage engagement in the practice studied. A designer needs a sketching material with which to hold a dialogue (that it is possible to go in dialogue with). The format of field material is important since the material is a medium for exploration and experimentation. To utilize the qualities found in field material designers must approach the material in the same way as ethnographers do:

> “Any faithful description of designing must take account of the fact that designers work in a medium – in our examples, they draw on paper – and literally see the evolving products of their work.” (Schön and Wiggins, 1992)

Donald Schön and Glenn Wiggins point out that the medium is one of the most important aspects of the design process. As described under the previous theme, the experiment is a crucial part of the design work. The approach presented here is a development of what Buur et al calls ‘video as design material’ and it connects back to the ‘turn to the social’ and more specifically, to an
ethnographic perspective. The “Between estrangement and familiarization” paper (in this volume) explores a “transitory window between an estranged view on what is and a familiarized gaze on what could be”. Our aim is to explore possibilities that do not break away from what is expected, but are instead an extension of ‘what is’. It is about exploring both the things we [think we] know and the things that are hard to grasp. “Confronted with the exotic, we have sought to render it recognizable in its own terms […]. When faced with the familiar we have sought to estrange ourselves from it” (Ibid). It is about not taking anything for granted but inquiring into the possibilities presented by the various aspects.

A flair for practice is about how we look at existing practices, acknowledging that we can only see what is happening in front of us, and we do not know why things are the way they are. It is about how practices are socially organized, not about why. Ethnomethodologists explore a practice to be able to produce a description from a practitioner’s point of view. In design work of the kind described here, the aim is to allow the work in the design process to stay close to the field material, thereby striving to adopt an ethnomethodological way of looking at everyday practice. The purpose of the exploration presented here is different from what ethnographers normally do since it is spurred on by a design interest; the “mentality” is, however, similar to that of ‘CSCW ethnographers’. The selection of material to be used in the design session is crucial. It must be possible for people with limited insights into practice to interpret the material, and it must tell a story. I have worked primarily with video snippets; in selecting a still image, however, similar criteria are applied.
This picture is from one of the process plants where I have carried out field studies. A rubber hammer is placed between a fire extinguisher and the wall. The marks on the wall show that the hammer has been placed there hundreds of times.

In the picture above, it is the traces of activities which make the picture interesting. It is easy to imagine how many times, how regularly, the hammer needs to be used. It does not say what the hammer is used for, but it indicates a need for being at this particular place. In a design session with IT designers this picture alone can shed light on the misconception that process operators run the process solely from the control room.

In one instance we created portraits that consisted of a number of pictures which included what the person in the picture had said. We called these portraits Pixi books and they are described in more detail in the “Present-ing the User” paper.
We added text to the pictures in the Pixi books to make it easier to access what happened during the study.

In the picture from the Pixi book, the text acts as a complement, providing the operator’s own explanation for looking down into a particular shaft. In this case, it also says something about the monitoring system that the operators use. What these pieces of design material have in common is that they say things about the practice of working within the process industry. Anyone can make the kind of interpretations that I have made here, and that is the point. It is not descriptions stating facts, rather, our chief concern is to discover evocative hints about how to look at the practice concerned. Looking at both pictures one can come to think about if the process operators look down shafts on a regular basis. The pictures do not come from the same plant, but by combining them they can initiate further exploration. Since we typically involve the people whom we followed during the field study the design material may also evoke exploration that goes beyond what is in the material.
In the “Process visions” project we dealt with automated process plants. We worked together with process workers from a wastewater treatment plant, a sugar factory and a chemistry factory. This project was initiated as a continuation of an earlier one working with a wastewater treatment plant (Nilsson et al, 2000). At this point, we wanted to compare the sites and see if the concepts that we had previously developed would also suit these plants. We started the project by conducting short field studies at each of the new sites. This example (which can be found in a more elaborated version in the “exploring the future” paper) illustrates how the “analysis” can be carried out during a design session. We invited designers to this design session; they were familiar with the process industry and they were asked to look closely at how people meet in the process plant studied. Some of the field material has been selected and made available as video snippets (approximately one minute long) and video cards labeled “Meeting cards”.

The group started by dividing the “meeting cards” among themselves and agreed on trying to establish a few categories that could act as a basis for scenarios. After a while they started to present the categories they were able to make out. Someone brought up how the work was co-ordinated around a problem. A theme evolved called ‘circles’, providing a label for who is involved in a particular problem requiring attention. A discussion started about what a possible future might look like; someone took up the idea of using an intercom for communication among members of the ‘circle’. The designers talked about different ways of choosing
whom to talk to through the intercom system. In this discussion someone says, “Also it is an obligation, if you don’t talk about what’s relevant you get lynched”.

Looking at this short example some observations can be made. By starting with making groupings the group lets the material define the categories. For a moment the group uses the notion of an intercom system as a vehicle for the group to develop the ‘circle’ theme. In the next stage, one of the designers refers back to the practice and the work practitioners in bringing up the ‘the obligation’.

This way of working with video snippets from ethnographic studies is an attempt to make the shift between what can be seen as an ethnographic analysis and a design exploration happen seamlessly. The designer has an agenda that is different from the ethnographer’s and for this reason the inquiry may take other directions. The field material forms the basis of the experiment. The exploration of a practice argued for here can be seen as a form of “sketching”. If something that is gleaned from the material does not lead to any design openings, designers can choose to make a new reading. Buur, Binder and Brandt have made a point in using video as design material rather than look for design implications possibly found in ethnographic video; they stress the quality of the ambiguity of video material (Buur et al, 2000). This ambiguity makes it possible to have many readings of the material, making it rich and useful. Video as design material is an alternative way of making sketches. As a material, video is highly participative (Minneman, 1991, Jordan and Henderson, 1994) and it is therefore of great value when used in collaborative design sessions. Video that comes out of a field study helps designers remain in the context they are designing for. Video is also rich in the sense that it contains fragments of uncountable aspects of the design situation, and it also has the quality to store things which may not be seen from the start. Video material makes room for different interpretations, and in the design process this is particularly useful as one can see how a situation can be different. This means that the design situation must be investigated, and that the
designer must experiment with design ideas applied to the situation at hand. Binder (1999) saw the richness of video documentary and how it could be used in a collaborative design process. In an attempt to make use of this, Buur et al started to produce video stories. The collaborative work with creating these stories aimed to go beyond the view of video as “hard data” and see it as sketching material by which a design problem can be framed and a design move implemented. Buur, Binder and Brandt (2000) provide some examples of what video as design material can look like.

"The video portraits are our first design representations. They set the stage for our design work by being the first attempt to portray the environment, the people and the activities in a way that make sense to us as well as to the people portrayed. " (Buur, Binder and Brandt, 2000)

The authors stress the importance of regarding the video medium as a means of establishing a design conversation in which the design material is open to interpretation and use. Setting a “stage” is the first part of establishing a design situation with which to experiment. It is a design situation of exploration which includes inquiry and envisionment. The format for establishing such a situation can be made more or less explicit. Buur and Soendergaard (2000) present the “Video card game”. The game is a “sense-making” exercise where a design group works with a large number of short video sequences, each represented by a paper card with a key frame from the video. In working with the material categories emerges and by arranging the cards the design situation is framed.

To summarize this theme we can turn to what is important to for ethnographers making inquiries. Early ethnographers, e.g. Robert Park in 1920 cited in Crabtree, 2001, p.188 advocated ‘first hand observation’. In the approach presented here, the design team can gain ‘first and a half’ hand observation from the video snippets (a half, due to the fact that it is filtered through a video recording and that the selection is made from the entire field material). The way
we work with field material is inspired by interaction analysis (Jordan and Henderson, 1994). With such an approach, an ethnographer does not take on the role of being the analytist in the team. Instead, the field material and the set-up of the design session are arranged in such a way that they enable the discussion to remain based on the material, and all participants share the responsibility of making sense of the material.

Explorative design work of this kind has many elements in common with an ethnographic analysis phase. Creating ‘categories’ with a starting point in what one sees in the material and framing areas of interest are done in a way that is similar to how ethnographers work. Where it is different is that ethnographers typically take the analysis further in order to understand; designers impose actions on the material to see where it leads.

The task of creating a social practice perspective in a collaborative design setting has become for me a task of offering preconditions that strongly encourage engagement with field material. The exploratory design process prescribes a continuous exploration of the practice. When one loses the sequential thinking of understanding before designing, some concepts found in ethnomethodology are also readily apparent in design work. The notion of ‘seen but unnoticed’ is sometimes used within ethnomethodology to explain the benefit of careful observational studies. In discussing mockups and prototypes, Ehn reflects on what makes design artifacts good: ‘If the design artifacts are good, it is because they help users and designers to see new aspects of an already well-known practice, not because they convey a theoretical interpretation’ (Ehn, 1988 p.113). What are ‘unnoticed’ in everyday life are the design openings, i.e. the potentials for change. As designers one look at the existing practice for the purpose of change, and what one want to see are ‘seeds of the future’, i.e. well-known things and practices that are just are waiting to be noticed.

Accepting an ‘ethnographic perspective’ as part of the design process is to engage in the field material and focus attention on details and foster curiosity. It is not from descriptions of practices
that design openings derive. Rather, it is *in the process of exploring the practice* that design openings occur. I thus conclude that to set-up a successful design session with ‘a flair for practice’ is to create preconditions which correspond to what ethnographers do when they analyze material from a study. The difference lies in the intent and that a designer takes on a design orientation.

What I am suggesting is to impose a (special) flair for practice into the design process. The format of the field material and the design session set-up constitute ‘handles’ that can be turned for this very purpose. In the next section, theme three, the format of the field material is discussed in relation to collaborative envisioning of possible futures. In the fourth and final theme I argue the case for a game-like set-up of design sessions, which encourage engagement in field material as part of a design oriented process.
Theme Three – Co-authoring

Narratives are never either purely individual or purely cultural. They build on, and have to refer to the audience they are aimed for to make sense and at the same time they carry the potential to change and make the same norms and conventions insecure. And they seem to have a direct effect on what is seen as both impossible and possible in human activity and experience.

(Authors’ translation of Gislén, 2003)

Traditionally ethnographies are descriptions of “what is”; here, however, I want to use ethnography to inform the creation of stories about “what can be”. In one of my early attempts to use an ethnographic study in a project the description became rather closed. We studied truck drivers and how they found delivery addresses (Johansson and Pettersson, 1999). It was a fascinating project and it enriched our insight into how this practice functioned. In retrospect, I can see that we could not find a way of working with the study so that it would lead to new design concepts. We started working on the design concept merely “inspired” by what we had seen during the study. As a reaction to this, I wanted to explore how it was possible to sketch using bits and pieces of ethnographic material. This section is about co-authoring design material and co-authoring stories envisioning practices. First, I will give an introduction to what design material is and some background information as to why I have been working with it. After that, I will go into the practical details of how the design material has been co-authored. Finally, I will show how the design material has been used to co-author possible futures within the scope of design sessions.

Design is always a collaborative activity, and accepting designing as “searching for design openings” prescribes a design process where exploration and negotiation are central. People have different interests and backgrounds. Design projects tend to grasp more than what a single person can master, and this applies equally well to the conceptual level. User-centered approaches and
industry consortia are perhaps the most obvious expressions of the need for collaboration we can see today. It has become increasingly important to explore how to engage a multitude of stakeholders in the same design process. Techniques such as brainstorming are used extensively and scenarios have become increasingly popular. To illustrate concepts researchers like Howard and colleagues (Howard et al, 2002) have hired actors to illustrate possible future scenarios. Dramatizations have been used to involve users in the design process (Ehn, 1988, Verplank, 1995, Brandt and Grunnet, 2000). Inspired by forum theatre, Binder and colleagues (Binder, 1999, Nilsson et al, 2000) engaged work practitioners within process industry to use in their work environment generic props and act out scenarios in front of a video camera. Binder stresses the importance of co-authoring, letting the work practitioners create the scenario together with the designers (Binder 1999, Buur et al, 2000). Rather than users reacting on designers’ illustrations, the scenario is created and negotiated collaboratively.

As stated previously, I have worked with ethnographic field studies and field material in collaborative design workshops. The sessions in which we have used the field material are similar as well as different from what Jordan and Henderson call “interaction analysis” (Jordan and Henderson, 1994). They are similar in the sense that a group of stakeholders meet to watch short segments of field video that have been chosen by the researcher, and the material is looked at carefully. They are different in that the ambition is not only to find out how it was at the time the study was carried out, they also strive to find out how things will look in the future, what will still be there and what will/can change. The idea is to make a participatory inquiry (searching) for design openings. The ambition is not primarily to describe how things are at the present but envision how they might be. To open-up the field material for a second co-authoring, we selected more than 20 short fragments from each of the three different process industries (video snippets with a duration of one minute or less). In workshops with process operators we could observe that the latter had no problem
in putting the snippets in context and they could tell stories about their practice, using one or more of the snippets.

When Schön discusses sketching he stresses the importance of design material, and he gives it a voice of its own, i.e. the material of the design situation “talks back” to the designer. “In the designer’s conversation with materials of his design, he can never make a move that has only the effects intended for it. His materials are continually talking back to him, causing him to apprehend unexpected problems and potentials” (Schön, 1987 p.63). Schön discusses the sketching carried out by an individual architect; the backtalk to which he refers also applies, however, to collaborative sketching. Habraken and Gross have a similar view and extend it to a collaborative design process: “The interaction between designers and the configurations they organize and shape is at the core of designing” (Habraken and Gross, 1987 p.1-2). The design material is one of the possible handles that we can use when setting up a design session. This theme is introduced by a quotation from Gislén, a researcher with an interest in interactive storytelling. Gislén’s description of ‘narratives’ shows the potential of evolving stories. Narratives ‘builds on and have to refer to’ the know culture, still they have the ‘potential to change an make the same norms and conventions [that exists in the culture] insecure’ (Gislén, 2003 p.76). My interpretation of this is that it is the backtalk in the ‘conversation’ with the culture that makes the changes in narratives possible. Gislén sees storytelling as an agreement. Stories rely on the listener to accept the agreement to be quiet until there is an opening that invites questions etc. Gislén continues with a statement that telling stories is about establishing ‘game rules’. She gives as an example of the detective story depends on the unspoken agreement that the reader does not read the last page first. The rules governing how stories are constructed are based on cultural convention just like the detective story. Collaborative storytelling (e.g. co-authoring) is not part of established convention, and Gislén predicts that explicit rules (game rules) will be needed until this it is (Gislén, 2003 p.202). Gislén’s work on narratives is closely connected to the co-authoring of possible futures argued for here. Below I will give examples of
how ‘cultures’ can be co-authored. In the following theme I will
discuss design games and explicit rules.

In all projects included in this dissertation ethnographic studies
have been carried out. We have used video as our primary way of
what sometimes is called ‘collecting data’; we prefer, however, to
see it as co-authoring of design material. We have concentrated on
short studies, spending on average about one week at each site.
For the Process visions project we spent a little more time at the
different sites, in total, about four weeks in process plants. Our
engagement with the practice and the practitioners was much
longer than the study, since we involved the practitioners not only
as informants but also as co-designers. As soon as an ethnographer
(or designer for that matter) steps into a practice with the
intention to studying it, those people he meets act. They know why
the study is being carried out, and they have an idea about what is
relevant to the design project. Some ethnographers strive to
disturb the practice as little as possible (e.g. Goodwin and
Goodwin, 1993) by mounting stationary video cameras and then
leaving the place of inquiry. In the approach presented here, the
approach was the opposite. Short field studies such as those we
have carried out depend on a co-authoring process to be efficient.
Just as the practitioner studied adjusts what he does, the person
doing the study chooses his focus and asks the questions that
might reveal something that can be useful later on in the process.

When I study someone in a field study I am constantly asking
‘what are you doing now?’ and I try to encourage the practitioner to
describe everything he is doing, even when I think I understand.
My motivation for doing the study is to create a design material
that is useful during a design session. The design material is co-
authored in the sense that the person studied as well as the person
holding the video camera acts. An example of what typically
happens during a study is that the person being studied takes
extra tours showing the workplace or s/he chooses to work on
things that s/he thinks is of interest for the project.
Many of the people we have followed during a study have enjoyed being in front of the video camera. It becomes obvious that they are acting for the camera, and this is something we use when we create the design material.

I have repeatedly stated that design is collaborative by nature. As part of a study of computer support for design practitioners, Minneman observes that design tools “have traditionally focused on supporting the individual activities of lone designers” and that that kind of approach needs to “be seriously rethought and refocused” in the light of his study (Minneman 1991 p.158). In all of the projects I have been involved in, ethnographic video and video cards have been used as sketching material. The idea is that the sketching material should become collaborative building blocks for the participants partaking in design sessions. The objectives of the building blocks are twofold: first, the ethnographic snapshots are intended to anchor the design dialogue in existing practice; second, they function as boundary objects (Star, 1989) when stakeholders meet. The video cards can be arranged so that participants in a workshop can make sense of the work practice, find problems and formulate design ideas (Buur and Soendergaard, 2000). As physical artifacts, the cards facilitate collaboration in that they are durable (unlike video snippets that have a beginning
and an end), the cards keep the discussion ‘on the table’. Ehn argues that “design artifacts bring earlier experiences to mind and that it ‘bends’ our way of thinking of the past and the future” (Ehn, 1988, p.110). That mock-ups bend our way of thinking is probably true for those familiar with the environment for which the mockup is designated. The video cards include information about the context and activities that can take place there. This quality is crucial when working with a wider group of stakeholders.

To adjust to different project set-ups, the shapes of the video cards we have used have been changed from one project to another. The cards have all contained a still frame picture from the video snippet. They have taken the form of black and white paper cards, color paper cards, and color plastic cards. Some have included text and some have only contained numbers (to identify which card is connected to which video snippet). They have varied in size. The numbers of cards has also varied. Some cards were one-sided and others double sided.
In the Process visions project we made our first attempt to use video cards. Headlines were written for each snippet. We could observe that the cards were used as referents to the video snippets.

The second version of the cards in the Process visions project had a short summary of what the snippet was about. The intention was that the group should first look at a collage and afterwards use the cards to build stories. What we could see was that these cards came to represent the video and eventually took its place.

In the Experimental office project we created cards that did not contain any text, only a number that identified which video snippet was connected to which card. What happened was that the different groups started to refer to the numbers and the discussions associated with the card.
The video cards are a way of introducing ethnographic field material into the design process as collaborative sketching material. The different cards came to play different roles in the different workshops. In the Process visions project, the white video cards allowed the participants to make notes and on a few occasions the partaking process operators also changed the headlines. The white video cards were used primarily as reference to video snippets. The blue video cards built on the work we had done in a previous workshop with the white cards. In that workshop we talked a great deal about how people meet at the plant, and as continuation of that, the blue video cards all show different sorts of meetings observed during the study. The blue video cards contained a text describing the snippet. The workshop participants were first asked to look at a collage and afterwards use the cards without going back to the videos. While the white video cards referred to the video snippets, the blue ones represented and in some sense replaced the videos. The video cards used in the Experimental office project only consisted of a key frame image and an identification number. What happened with these cards was that the groups started to use the numbers on the cards to refer to previous discussions associated with these cards. One example (presented in the Partner Engaged Design paper) is that a card with the number 22 showing a small meeting room came to be used as a reference to “soft meeting rooms for relaxed meetings”. This particular card did include an image of slightly more comfortable chairs but what it represented was a discussion that sprang from a discussion the group had while looking through a number of cards. Card 22 was deliberately chosen to illustrate something the group had seen but was not directly represented by any one particular card.

In his examples Schön (1983) writes about the designer using drawings as his/her sketching material. A pencil and a piece of paper can be a functional sketching material for the professional designer. In all projects presented in this dissertation we have involved future/potential users in the design process, and in this projects we have decided to use in the main other kinds of sketching material. Two aspects have been considered:
participants without training in drawing might have difficulties in expressing themselves in drawing form; second, the design sessions we arranged emphasized the collaborative aspects of designing. We wanted to give the participants as similar preconditions as possible. The video cards were a way of sketching using field material. The first set of video cards (in the Process visions project) were used as if they were a physical interface to a video editing station (the researchers played the wizard of Oz and made this metaphor even stronger). While building using the second set of video cards (the meeting cards, in the Process visions project), the cards took the role of the actual video snippets; they described activities and it was these that the workshop participants worked with. In the Experimental office project, the video cards were first introduced as ‘set-pieces’ and used to place functions on different layouts representing a future office. In a workshop later on in the project the same cards were used to build portraits; instead of being set-pieces they now represented wishes and desires of the future users. As a collaborative sketching material, the video cards and video snippets could be used to explore different aspects of the Experimental office.

The number of cards varied a great deal in different projects and design sessions. In the Process visions project we created a large number of cards. In the design sessions the groups made choices about what to include based primarily on the headlines. We could also see that some cards were not used. We concluded that the participants avoided those cards they found difficult. Assuming our conclusion is correct, this was rather unsatisfactory since one of the qualities of working with ethnographic material is that it offers some resistance. If something is avoided it should be clear that it is indeed the case; participants must make their thoughts explicit. In later projects we carefully counted the number of participants and went through the assignment to see how many cards were needed. In the Experimental office we introduced “game boards” (this is elaborated on in the next section) that ‘forced’ the participants to make conscious and explicit choices about how the different video cards would fit the future office.
In the Process visions project the participants in the design workshops created stories more on the lines of storyboards. The stories were very much based on the field material. In this project, the participants were process workers and technology developers with extensive experience of working with process industries; they could see the ‘missing’ parts of their stories. After looking through about 20 video snippets (all represented by a video card) one of the groups in the first Process visions workshop was given the assignment of creating a story to illustrate a typical workday at a particular plant. They discussed briefly how the day starts with handing over from the shift-crew leaving its shift. One walks around the factory before sitting down in the control room, after lunch a quality analysis is made and so on… In one case, the group had placed six or seven cards in a row on the table. One operator asked, “wasn’t there something else?” A member of the research team pointed between two of the cards, “was it here?” A second process operator picked up a video card from a pile, and held it so the others could see, and asked; “could it be the one with…?” The first operator took the video card and placed it at the spot suggested saying at the same time, “yes, yes it was”. It almost looked like they are retelling a story heard before, but they were
creating it out of an understanding of “how things are done” around the plant. The process operators talked a lot about the differences between the process plants, they asked each other questions concerning this.

In this session we explored the work practice by creating stories about current practice. The participants used the video cards and video snippets to describe their work practice. While looking through the video snippets and arranging the video cards they discussed what should be part of the story. The video cards were laid out as storyboards and the videos played in the same order. In this way, the process operators took part in co-authoring the field material (during the study) as well as co-authoring the description of their work practice. The outcome of this session was a number of themes (described in theme 2) that could be recognized in all three plants, and which we wanted to explore more.

In the Experimental office project, and later in the Comit project we started to explore alternative ways of creating stories. Inspired by the game Scrabble we made up rules for a cross-word-like story creating game. All the video cards were divided among the participants; there should be at least six video cards for each participant. One participant was given seven or more (the numbers
were pre-determined) extra video cards, and from his hand he initiated the game by creating a story about one potential user (usually based on a person working in the existing practice). After this, the participants took turns in building shorter stories that connected to one of the cards lying on the table (they used three cards from the hand and one from the previous story/stories). When the cards were all on the table, the group summarized what had been narrated and tried to find patterns in the cards. We called this game the Portrait game. We found that in this design game all participants were able to contribute small stories that that combined to form a larger one, and the meaning of each story was negotiated. In one of the portraits that were built sub-stories about ‘synchronization (with colleagues)’, ‘spaces for old projects’ and ‘checkpoints (in the projects)’ were included. At the same time as the cards and the practice they depicted were explored, ideas about how ‘it could be different’ became an integrated part of the game. The crossword-like pattern allows many aspects of one person (both characteristics and priorities) to be present at the same time.

There is a difference between collaboratively creating a story of ‘one day at the plant’ and creating visions of what an Experimental office could look like in the future. Story creation as a way of getting into the material was applied in both sessions. In the Process vision session, the participants in each group developed an understanding of the practice; this was passed on to the other groups. In the session from the Experimental office project, the groups explored the various practices but also investigated possible new practice. They added a critical perspective to the material that was not visible in the Process visions session. The material was accepted but the question was continuously raised ‘is this is how it should be?’. What the groups in this session could show the other groups was their vision – a vision, which in the light of the video material seemed a reasonable one. The vision is a statement about what to engage oneself in. This incorporates, of course, a balance act. One of the groups in this Experimental office session tended, for example, to engage too little in the material and ended up with visions that were not based on the material. There was no ‘future
user’ taking part, something that could have changed the situation. Also, all but one of the participants in this group were new to the project; as arrangers of the session we should have taken that into greater consideration, e.g. it would have been better to have mixed the groups in a different way. The facilitation and the frame for creating the stories could have encouraged greater engagement in the material (this will be discussed in greater detail in the following section, theme four).

In the Process visions project our research group developed a way of enacting scenarios with users in their workplace (Nilsson et al, 2000). In the Comit project we worked in a similar manner with user enactment. The Comit project focused on the transition between work and leisure time, i.e. work and private life, which meant that the enactment stage involved activities which were not related to work. In Comit we used time in a design session to plan the scenarios before acting them out. This was a way of letting a larger group take part in the creation of the scenarios. The developers from industry proposed their ideas and the group negotiated until they found a solution that ‘made sense’. An example of how the field study informed the scenarios is when we observed how one of the users in particular dealt with technology as ‘managing ecologies of devices’. He used several gadgets in a way for which they were probably not designed, e.g. he called from his cellular phone to his stationary telephone at work to leave a message to himself so that he could make an entry in his hand-held computer (he had not brought this as he was afraid of leaving it somewhere). Such ‘managing’ activities became one of the qualities introduced into the future scenarios we co-authored. As the scenarios emerged more than one of the suggested concept ideas could be a part of the same scenario without taking over the activity (this is discussed in greater detail in the ‘Contextualizing Mobile IT’ paper).

The conclusion drawn from this theme is very much in line with what Gislén states about narratives. What Gislén found in story creating seems also to be true for design scenario building. Sketching needs to refer existing practices and make sense to all
participants since it is a part of changing ‘norms and values’. As Schön demonstrates, sketches are a tool in the design process and not only a means for visualizing ideas. For a collaborative design session to be successful we must therefore look for design material that enable joint “conversations” at the same time as they allow for plasticity and ambiguity that make them suitable boundary objects. Video as a material is very rich, a short snippet can contain several different elements for a story, it can provide a picture of the context and mediate feelings, it can show one or many activities etc. Video is also a highly participative media, which is why it is especially suitable for co-authoring of possible futures.

Co-authoring is both about creating the suitable design material and building with it. The participatory inquiry makes sense both when describing ‘what is’ and when co-authoring ‘what can be’. Co-authoring is what makes it possible to draw new things into stories about practice. It is when ideas and visions meet existing practice that interesting things happen.
Theme Four – Games as world constructions

Freedom in restrictions. Designing requires restricting design. Without restrictions a designer would be unable to choose from the possible actions he could take, he would be paralyzed. (Gargarian, 1996 p.132)

In a study of designers’ practice John Habraken and Mark Gross develops “concept design games” as a way of ‘isolating and focus on single aspects’ of designing (Habraken and Gross, 1987 p.1-2 – 1-3). By observing the games being played they studied how designers manipulate and transform artifacts during a design process while making agreements and rules about how to go about their work. Their notion of games is ‘linked’ to Wittgenstein’s language-games (Wittgenstein, 1953). Just like Wittgenstein, Habraken and Gross are interested in how rules are negotiated. They explain the similarities between their game and the notion of ‘language-games’ in terms of both being “played according to a specific but not fixed aggregate of rules” (ibid, p.2-1) and “Our design games are a conceptual tool then, in the way that Wittgenstein’s language-games emphasize what people say, our design games emphasize what people do” (ibid p.2-11).

Wittgenstein established that language derives its meaning through use. Habraken and Gross explore how the design artifacts (game pieces) acquire meaning in their design games (1987 p.2-12). Taking as a starting point a similar view the gaming idea presented here elaborates on the ‘concept design games’ aimed at imposing a design practice and creating a basis for collaborative design work. The idea behind design games is to construct a collaborative design laboratory to provide a structure for collaboration.

In theme 3 I suggested that since there are no established conventions (formats) for collaborative designing it is crucial that rules are set up and made explicit. In this theme I show how rules can be set up to guide collaborative design work. I first introduce how design games have been used in earlier Participatory Design projects. I then present how the projects in which I have been
involved have created and used design games. A number of design games are described and explained in relation to the projects in which they played a role. Finally, I include some thoughts about how the creation of design games can be a design activity in itself, i.e. a way of focusing the collaborative design work in a desired direction.

Within the Participatory Design tradition the most widespread example of design games is probably Ehn and Sjögrens games created for carpenters and newspaper workers (journalists’ and typographers) (Ehn and Sjögren, 1991). The justification for the design games developed by Ehn and Sjögren was to involve users in the design process. It “is about the participatory side of design, and the necessity of taking the users’ experience seriously. This is why we have been playing games, not at the price of seriousness, but as a necessary precondition for engaged and more democratic participation” (Ehn and Sjögren, 1991, p.267). Ehn and Sjögren stress that the design artifacts in the design games must “make sense to all participants” (Ehn and Sjögren, 1991, p.253). One of the games, “Carpentrypoly”, is inspired by the game Monopoly in which the players must adapt to the changing circumstances the game presents to the players’ carpentry shop. In the case of the typographers, an “organizational kit” was used. The game is described as a learning process which serves to find a common language for discussing future visions, work organizations and technology (Ehn and Sjögren, 1991 p.252). While learning ‘how things are’ was the aim of the games presented by Ehn and Sjögren, the games that Habraken and Gross developed strive to frame emergent concepts. The games are not only a way of passing on knowledge but also a way of creating new categories and perspectives.

More recent work is presented by Buur and Soendergaard (2000) who created a video card game that was used within the domain of process industry. This approach is rather similar to that presented in this dissertation, although it is more evaluative in character. The video material originates in a usability test workshop, where users were asked to install prototypes of heating regulators. In the
design sessions, developers looked at video snippets selected by the usability team and organized the video cards in groups to explicate particular themes. In one sense this approach can be seen as way of doing “evaluative ethnography” (Hughes et al, 1994) in a gaming format. On the other hand, Pedersen and Buur argue that participants in a gaming session develop a “design vocabulary” and “carried out rapid experiments” (Pedersen and Buur, 2000), something that goes beyond evaluation and toward envisioning the future.

Liz Sanders and her colleagues have created several design games that share a common desire to give participants the means for expressing themselves. Sanders regards the games as a new language for collaborative designing. The games provide a toolbox filled with a large number of components with which the participants can “create artifacts that express their thoughts, feelings and/or ideas” (Sanders, 2000). The components may take the form of schematic figures or paper cut in geometric shapes. The participants are encouraged to draw on the material to produce the desired results. The games “take advantage of the visual ways we have of sensing, remembering and expressing. The tools give access and expression to the emotional side of experience and acknowledge the subjective perspective” (Sanders, 2000). The format of the design games presented by Sanders are comparable to the approach presented in this dissertation, it is in the design material that it is possible to see the distinguishable differences. What Sanders present is a highly evocative and conscious making way for participants to express themselves, while what is presented here imposes snapshots from field studies that offer resistance to existing ideas and that encourage exploration as a way to find design openings.

Iacucci, Kuutti and Ranta have developed “role playing games with toys” (Iacucci et al, 2000 p.193). The goal of the games is to create a number of use scenarios that can be used later by developers. The game takes place on a table where a campus and other relevant places are represented. Each player is given one plastic toy person representing him/herself and acts out how to use new devices and
services. During the game the players must deal with “non predefined aspects” and “incidents” After the games, storyboards are created showing several different scenarios that have been acted out. Rather than trying to support a “rational discussion” the games functioned as a way of “projecting the group of players in the future situation” (Iacucci et al, 2002 p.199)

In the approach presented here, the design games are a ‘structure’ for collaboration at the same time as the games are sketching material. Ehn and Sjögren stress that design artifacts should make sense to all participants; they also suggest “good examples” which are useful when wishing to make design moves (Ehn and Sjögren, 1991 p.253). The design games presented here are used as structure for collaborative sketching, and making sense of the design material is a part of the game. Participators in design games should be active in establishing the stories because it is in the process of creating meaning that opportunities for initiating change arise. It is about getting to the state of a story where it is possible to imagine what is reasonable that the next step could be. Gislén describes collaborative storytelling as “a telling that is created collaboratively by several participants, and where everyone has the feeling that the common creation is the direct result of their own actions. [...] an activity that circles around the question of possible human action, and causes and circumstances for these actions” (Gislén, 2003.p.201, 200). The design games are not only a means of communication but also for establishing a ‘story telling mode’, e.g. in the Portrait game the players add small stories to what is already on the table. The rules of the game make the participants connect the new story to the existing ones when at least one card must be shared.

In the projects presented in this dissertation many variations of design games have been used. The design materials used included video cards, as presented in the Co-authoring theme, and still images (usually taken from the field videos). Some of the design games that were created and used are described below; they reflect what the focus has been in each variation.
**Portrait game**

To get a grip of the people that we designed for in the Experimental office project we created the Portrait game. It is a game where we mix material from different people and sites. The idea is to explore what a potential future user might be like, and what that person does and doesn't do.

The players gather around a table and cards are divided among them. One player is given seven extra cards; this player makes the first story with seven cards. When the first story is on the table, all the players take turn to add their own stories using three cards. These cards are connected to the story/ies already on the table in a crossword-like manner. There need to be enough cards for at least two rounds of the game plus the extra seven for the initial story.

We have played this game in the Experimental office project, the Atelier project, and in one commercial assignment.

The reason for creating the Portrait game was that we felt that it was essential to establish ‘the users’ as central in the design process. In the design group this game is a way of establishing the users as dynamic social beings to design for. The created ‘users’ become boundary objects to whom the design group can relate. More details about this game can be read in the “present-ing the user” paper, as well as in Brandt and Messeter (2004).
Landscape game and Vision game

The Landscape game is a game about how things, activities and people relate to each other and how they may relate in the future. In this game we have used game boards. Some were generic boards of which the participants have to invent a meaning; others were physical layouts resembling for example an office.

The rules of this game are that the players take turns in choosing and placing video cards on the game board. For each card that is placed there must be a reason, and the other players needs to be convinced that the reason make sense. All video cards should be placed on the board, before the game is finished. The outcome of the game is a pattern that creates a portrait of a user.

The Vision game is a version of the Landscape game where visions of technology are placed together with the video cards. We have worked both with existing technology, and on occasion new concepts have been created during the course of the game.
This design game can be played in two ways. Either as an extension to an already played Landscape game where the participants are asked to place the technology in relation to what they have already placed on the board. The other version starts with an empty game board, video cards are placed in such a way that resembles what the participants would anticipate that the ‘use domain' would look like. In both versions, the players take turns in picking technology cards and place them where they are useful. Some cards may be rejected as unsuitable in this game (this indicates that these visions might need to be reconsidered). If a player notices any relation that is not the visions does not support s/he may add this on a blank card.

This game was played in Atelier, the Experimental office project and in a commercial assignment.

The Landscape game and the Vision game have a simple construction. Playing the games, on the other hand, is a complex exercise. In the Experimental office project we wanted to create game dealing with relations among activities and places (and technology in the Vision game). Since we wanted to explore what kind of office we were to work with, we chose to use boards that did not resemble an office. The participants had to make sense of the boards; this has at least two advantages. First, new/different interpretations of an office could (and did) occur; second, this strategy allowed participants to feel an ownership and a feeling that they have considerable influence over what is designed. When we found an office that could match the project needs the same game was played as a way of making the concepts developed meet the restrictions and realize the possibilities of the physical layout. This game is described in the ‘Partner engaged design’ paper.
Framing game
The Framing game is perhaps the game that comes closest to an ethnographic exploration. The group develops and refines a theme for each round.

The video cards are divided equally among the players. The first player starts a story by placing one video card on the table. He explains what it is he sees in the card and why it is interesting. The following players take turns in adding a video card to what is already on the table.

When there are four cards on the table the players must exchange one card if they wish to add a card of their own. The game continues until the group agrees that they do not want to change what is on the table. A quick debriefing session follows in which the players write down what the story is about.

Different versions of the Framing game have been played at different times in the Atelier project.

The Framing game was created as a way of encouraging the participants in a design session to work with ethnographic field material. In the Atelier project we worked with Interaction design students; we were both teachers and researchers and our task was
to design their facilities. The game was a way of demonstrating the strength of engaging in existing practices as well as a means of obtaining the students’ views of their own practice. The Framing game proved to be a simple way of generating several ‘categories’ or ‘themes of interest’ even when the group had little or no prior experience of working with ethnographic material. This game is described in the ‘Playful collaborative exploration’ paper.

**Trend game**

To explore trends within a specific IT-development domain we have created a version of the Portrait game. The game challenges trends by requiring ‘evidence’ or arguments for a trend in video material from field studies.

The Trend game is played in a similar way as the Portrait game. It starts with one story with seven video cards. The participants take turns in picking a ‘trend note’ which specifies a tendency that has been observed. The participants create stories about the different trends using at least three video cards as well as one of the cards already lying on the table.

The Trend game was developed and played in a commercial assignment and the ‘trends’ were provided by the marketing division of the company with which we collaborated. (Picture from workshop at PDC 2004)

Habraken and Gross explored different roles and ways of collaboration. They set up the rules in the concept design games so that the participants were issued with roles and they were told to strive to win the game. This is different from the design games presented in this dissertation, where the participants are themselves and there is no winner. The goal is not to win but to
find design openings that are realistic for the participants to adopt and take responsibility for.

The Trend game was a way of approaching data that was contributed by a marketing division. Part of this game was to make the trends less ‘flat’ and relate them to existing practices. Another part was to eliminate trends that did not move the project in the desired direction. A large project group played the game. The trends which persisted were accepted and included in the design world of the project (the group recognized the trends as their own).

The design games focus on different aspects of human practice. In all the games, players need to make arguments using the video cards. This is a way of imposing a flair for the practice (that is designed for). In the design games there is also a rule that says that each move must be explained to the other players. Sometimes this starts a discussion that might lead to a change of move. When the design games are finished, traces of the discussion remain in the form specific card arrangements. The arrangements are not thought of as independent representations of the process which anyone can understand without help. It is those who have been part of the process that can make sense of the arrangements.

A combination of a number the design games were played as part of the different projects. The Portrait game is a way of entering the field material, and the portrait created can be used in, for example, the Landscape game or the Trend game. It was noted in relation to the Trend game that after working with the Portrait game, participants had accepted “the user”. Rather than question ‘the user’ which they had created they questioned the trends. When ‘the user’ met the trends that the marketing division had provided, the players could determine which trends were of interest and which were not. The Trend game and the Vision game should not be seen as ‘conservative’ ways of restricting new ideas, undermining the work of marketing divisions; rather, they are a way of applying a use and user perspective to the process (a reality check). In the Vision game, ideas have been revised and new ideas developed.
In the Atelier project we played the Framing game in a digital version using digitally projected ‘video cards’. This game incorporates different gaming qualities; it is a mixture of the Landscape game and the Framing game. Instead of limiting the number of cards on the table (as in the Framing game) central cards were placed in the center and less central ones were moved to the periphery thereby creating a relation map (as in the Landscape game).

Using design games changes the role of the workshop facilitator. Workshop participants appear to accept the rules of the design games as a way to go about. In the Process visions project we did not explicate that we had organized the workshops with design games. We could have done the same assignments but introduced them in the guise of games and game rules; we did not do so, however. Later, in other projects, when we made it explicit that it was games with rules, the participants found it easy to grasp the design sessions. The facilitator did not need to be as active in ‘steering’ the collaboration; instead, his/her role became more that of a secretary, summarizing what has been said etc. I felt that it was easier for me as a facilitator to participate as a designer (player of design game) once we had made the game structure clear. The participants are quick to adopt the rules and do not hesitate to discuss them (more about this in the ‘Playful collaborative exploration’ paper). Being able to rely on the other participants with the added advantage of a facilitator role that is not as authoritarian as that adopted when games are not played made me feel comfortable playing as one of the group.

In the Experimental Office project we started to use game boards; it was indeed at this time that I began to see the design sessions using video cards as design games. In retrospect, the design sessions in the Process Visions project can also be seen as design games. There were rules, some turn taking, and a facilitator who managed and maintained the momentum of the group activities. In the Experimental office project the games set-up integrated some of the responsibility of the facilitator into the format; this was a
new development. The role of the facilitator as a driving force became less conspicuous.

Working with the design games has changed the format of the design material (described in Theme three). Some changes were of a very practical nature, e.g. we realized in the preparations for the Experimental Office workshop that the video cards had to be smaller than the earlier versions in order to fit a game board. The alternative of making the game board larger would have meant that the participants would not be able to reach the whole board; for this reason we chose to go for smaller cards. Adjusting sizes when creating design games is one practical way of designing and managing the design process. On a more conceptual level, we chose for the Experimental office different kinds of video snippets than those previously chosen. The design game we created was based on relations, both spatial and social. When choosing the design material to work with we chose activities that had a relation to the office space, we called those ‘set-pieces’. The only real difference between the set-pieces and the activity card was that the set-pieces incorporated things in the office in a more obvious way. At a later stage we also used the same video cards and snippets in much the same ways we had done in earlier projects focused on activities. Bringing in an ‘object perspective’ enriched the material; this perspective has continued to feature in the projects that have followed.

We have worked with a number of different game boards. In the workshops we have let the groups choose which boards to use and to decide what the markings on the boards mean. The aim is to create a feeling of ownership, and to make the participants think about and discuss the board they use. In one workshop in the Experimental office project we had divided the group into three smaller groups; coincidentally, all the groups choose a game board with the same layout. They read different meanings into the layout, however. In two of the groups the participants made changes to the game board: one group added extra areas that represented things which were not permitted in their office; the other group moved the center of the board towards one of the sides
They saw a connection to the physical layout, where the center of activities in their concept was the reception desk which they agreed should be close to the entrance. This could be described as co-authoring of the design games. The players adopt and start to experiment with the materials of the design situation.

Board games look like the games one plays for fun, and the rules are explicit. These qualities make the participants feel comfortable with the ‘unfamiliar’ designer role. The designing qualities of design games are, in my view, features which create the openness for experimentation that is so necessary in design. The design game approach suggests a way of collaborating, and it provides design artifacts that can function as building blocks. We have designed the games to encourage exploration of the field material. The building blocks created from video material based on field studies when combined with the rules of the design games impose a special flair for practice, grounding.

Constructing design games is design work in itself. Habraken and Gross created the design concept games to study how designers work. Design games are used here to structure and impose focus in the design process. The design game designer sets the rules and frames for the design work. With the design games it is possible to create experiments and the dialogues. This is a designer role that focuses on design as a process. Within the field of architecture a similar role comes under the label of “process architect” (Horgen et al, 1999; Fröst, 2004).

The design games we have been working with have rules that are explicit from the beginning. If the rules are to be changed this be discussed as part of the game. The design games frame the design situation and make it possible to impose perspectives and focus on the design process. The understanding and the evolution of design ideas are done in an interwoven collaborative process. Donald Schön has described the way architects work (1983) and Louis Bucairelli has done the same within the field of Design Engineering (1994). Schön writes about “design worlds”, how sketches talk back and how a conversation with the design
situation is established with the sketch. Buccairelli writes about “object worlds” as both the physical place where design work takes place and the mental image that designers create (Buccairelli, 1994). Design games can be seen as working models of ‘design worlds’ and ‘object worlds’ in which designers experiment with ideas and concepts in the same way as chemists in a laboratory or chefs in a kitchen. Design games create micro cosmoses, playgrounds where experimentation is permitted.
Participatory inquiry – collaborative design – sketching a conclusion

This dissertation has discussed the question of how ethnographic studies can be incorporated into collaborative design processes. “Searching for design openings” is a different research strategy to what to date is commonly practiced within the field of ‘design informed by ethnography’ within CSCW and PD. In ‘design informed by ethnography’ the aim has been to ‘support’ existing practices. Searching for design openings while supporting existing practice is a balance act. I have presented in the present dissertation a way of looking for design openings with a special flair for practice. My research allows me to draw the conclusion that it is not only possible to find design openings by engaging in ethnographic field material but also fruitful. Field material can take the role of building blocks, which can be used to co-author stories about existing practices and possible futures. Field material has qualities that make it suitable both as design material and boundary objects in collaborative design sessions. The use of actual practices as a foundation makes the design situation present and concrete. The field material resists simple interpretations; to repeat a point made by Nielsen (2002), it does not indicate how someone feel, it only provides the expression of it. Both Nielsen and Gislén (Gislén, 2003) stress the importance of letting the reader of a situation imagine the underlying justifications and circumstances to increase engagement. At the same time the field material is also open to those without professional training in ethnographic analysis: what someone actually does (manifestations, body movements) is observable to anyone if s/he looks carefully enough. The fragmentation of the field material makes it graspable, an essential quality in group-discussions, and it makes it more plastic (flexible) in creating scenarios. The design games provide a structure for creating the scenarios and for how collaboration takes place. The design games incorporate a ‘soft’ framing of the design situation; small observations create a way of talking about the evolving design conditions. The soft framing is a way of allowing new insights to lead to new design openings. Inquiry is built into design; it is an integral part of the design process. In recognizing this and working with design informed by
ethnography it seems to be a good starting point to make the inquiry an ethnographic one. This is not a separate part of the design process that can be carried out in isolation: it is here that the design situation is framed, and it is here that the design language is established.

From the research on ethnography in design that has been presented in the CSCW field one can see a clear division of labor leading to a way of working that can be described with the aid of the waterfall model. Ethnographers do studies and designers design. This split is unsatisfactory. We need to start thinking in design terms when we carry out field studies, and we need to be thinking about practice while designing. My experience of using ethnography in design is that it functions to make designers (trained or otherwise) focus on actual practices. Doing a study for a design project is a means of creating a design material; we can learn from how ethnographers work but we should not end up with the same kind of material as they do. Having said this, it should also be stated that a sociologist or anthropologist can make studies that are of interest to designers, this kind of study can continue to be critical of existing systems etc. and yield more general findings about human practice.

The quality that videos from field studies have in design work is that it helps the design team staying close to the actual practices. In a commercial project we used material from a field study carried out for other purposes; this material also functioned well as design material. The specific study of a use domain may provide more than just design material from other comparable settings: by working with competent design teams they can probably compensate for some of this. When the design material gives the feeling of being genuine, relevant and has meaning for the designers. This could perhaps be an alternative when there is no time for or resources to do specific studies.

I have not discussed in this dissertation how this approach relates to existing commercial IT-development practices. I cannot draw extensive conclusions in this respect from any of the projects in
which design games have been used. Industrial partners have participated, but I have not been involved in the actual development process. Many of the participating companies have expressed a desire to continue our collaboration in new projects (some of which has come true); this is not only flattering but it means that they have been able to justify our collaboration within their home organization.

Fröst has focused within the field of architecture on the problems and shortcomings connected with the early phases of the building process of workplaces. In an effort to impose a design-oriented work practice, Fröst observed that users (future inhabitants of the workplaces being designed) spontaneously adopted a design-oriented approach when working with workplace matters (Fröst, 2004 p.149), experimenting and trying out things rather than making an analysis and specifying requirements. Fröst stresses the importance of design dialogues, seeing them as a way of letting workplaces give themselves a challenge (Fröst, 2004 p.161). Fröst suggests that architects should take the responsibility for long-term requirements and create a situation where the users can develop and make concrete requirements with which an architect can work (Fröst, 2004 p.170-171).

Brandt has, within an industrial setting, looked into what she calls 'event driven design' using user collaboration. She has taken part in a number of projects in which she has been able to make design workshops a part of the design process (Brandt, 2001). Brandt has explored how to set up 'design events' both within an existing project organization (as a consultant), and from within a project organization that has as its starting point the workshop (event-driven design). Her conclusion is that it is better to have the expertise needed for driving these kinds of development processes within the organization itself. Brandt further argues that this requires changes in project leaders’ competence.

The approach presented in this thesis has been primarily concerned with the early phases of the design process. The findings of this thesis can be applied to the design session level, as do
Fröst’s. The projects I have discussed have the character of consortium. This is especially evident in the Experimental office project; where there were several stakeholders, and the approach presented here became a way to establish collaboration and to work collaboratively. The Atelier project was a collaboration between several research groups and a number of technology developing companies. The Comit project was initially set up in a similar way to that of the Experimental office but was scaled down to involve just a few selected partners. The Process visions project was carried out in collaboration with three process plants and a second research group. In all of the projects, the approach has offered a way of managing active user involvement in the design process.

The work presented here builds to a large part on the work carried out by Brandt (2001). Unlike Brandt, however, I was involved as an outsider (consultant or independent partner). Brandt experienced problems in being an outsider, particularly in relation to the project leader, and because she was not familiar with the project organization. In the projects I have taken part in, establishing a project organization has been an integral part of the process, as in any new consortium. Our approach has excited interest from the partners and it has been allowed to form the structure for the collaboration. When a project reached the production phase, the different stakeholder companies followed their own development processes and took responsibility for the process. I agree with Brandt that an event-driven process seems to be an excellent way of organizing user orientation; it is also a good structure for stakeholder collaboration.

As both Brandt (2001) and Fröst (2004) demonstrate, working with user involvement entails new design competence. The skills that are needed can be summarized as follows: (1) setting up an event-driven development process; (2) creating design material, and (3) organizing and facilitating workshops. In this dissertation I have investigated some of the skills under points 2 and 3. To create a design material is to create collaborative sketching material. In the approach presented here this includes carrying out field studies in
ways that make the resulting video material easily accessible in a workshop session and which outline the video cards in such a way that they become useful boundary objects. This requires an understanding of and sensitivity to what will work and what will affect the participants (as in the example with the headlines on the video cards). To organize and facilitate workshops (or a series of workshops) is to create a structure which fosters collaborative work. It is about dealing with people with different interests, roles and different backgrounds. Design games can be one of the ways by which to deal with this. The projects presented suggest that participants feel that their participation makes a difference. I suggest that design material based on ethnographic field studies can function both as boundary objects and as collaborative sketching material. Material functions best when participants take an active part in its production and feel that they own it. Letting participants provide input into design games (as in the trends in the Trend game, or technology in the Vision game) increased engagement in the games. I have presented examples of how different design games focus on different aspects of what is being designed. Working with field material and design games raises the question of what level of competence is required. My opinion is that this is a designer task and should be a part of the basic training for designers of technology. Recognizing the increasing number of consortiums being established and the growing interest for user involvement I see these tendencies as a call for new ways of working collaboratively in the process of envisioning possible futures.
Introduction and overview of the papers

**Playful collaborative exploration** (Submitted for publication). The paper focuses on how the open-ended nature of design games provides a basis for collaborative analysis that does not privilege simple interpretations while it offers at the same time a rich material for merging ethnography and design. We describe how game-like approaches can be used as a way of exploring a practice from a designing point of view. The design game described builds on an idea about the power of narratives and the benefits of constraining rules. The paper indicates that there is a point in playing around with the ethnography, and argues for a balance between basing design work on existing practice and creating necessary distance to the material.

(Partner Atelier)

**Partner Engaged Design – New Challenges For Workplace Design** was published in the proceedings of Participatory Design Conference 2002 (PDC’02) in Malmö, Sweden. The paper focuses on how we established a collaborative design process with many stakeholders, and describes how we have been working with a series of workshops. The space studio took on the role of the driving force at the start of the project, and the partners were drawn into a more and more intensive participation during the design process. The case shows that it is possible to reach innovative practice-anchored results with the design approach. The article describes a mind-set by which design teams can see the future in existing practices, and it describes some concrete examples of how it was used in the project.

(Projects; Experimental office)

**Design lab** (To be published in “Design Spaces” Binder and Hellström (eds) forthcoming). The design lab paper is an attempt to summarize the approach that has been developed in the Space studio over a period of more than 4 years. The Design Lab design approach engages in designing the process and designing the object
simultaneously. Within the Design Lab staging, evoking and enacting are focus activities for the exploration of existing practices as well as for new possibilities. The article also argues for ‘under-designing’ products, for the users to configure themselves.

(Projects; Process visions, Dynabook, Experimental office, Comit)

**Present-ing the user – Constructing the Persona.** (Submitted for publication). This paper is a reaction against the hype related to the “persona” recently posited by Alan Cooper. This paper argues that persona should not be a stiff character defined early in the design process; rather, it should be developed during the design process, the rigor should come from field studies and the persona can develop from exploration of the study. In this article personas are about making “the user” present in the design process. We claim that the work of exploring and constructing persona is best done as an integrated part of the collaborative design work.

(Projects; Process visions, Experimental office, Comit)

**Between Estrangement and Familiarization** (To be published in “Design Spaces” Binder and Hellström (eds) forthcoming). This paper is about expanding the design space by exploring its borders. Based on experience that design openings emerge as transitory windows between an estranged view of ‘what is’ and a familiarized gaze on ‘what could be’, the paper discusses how it is possible to make use of material from field studies in establishing such a window.

Even though there is great interest in design techniques such as personas and use scenarios, developers of technology tend to “stretch” images of use and the user to match initial design briefs. In this article we argue for involving ‘the people for whom one is designing’ in a design process in which equal effort is put into exploring existing practices and emerging conceptions of future use.

(Projects; Process visions, Comit)
Exploring the future (Published in “Searching voices; Essays in Interaction Design”, Löwgren and Ehn (eds) 2003). This paper takes as its starting point the ongoing discussion concerning design informed by ethnography/ethnomethodology in the CSCW community. A framework developed by Graham Button and Paul Dourish (1998; Dourish and Button, 1996) is used to categorize recently presented approaches as well as the approach presented in this thesis. An argument is put forward for active use of field material in design processes.

(Project; Process visions, Comit)

Contextualizing mobile IT (Published in the proceedings of Designing Interactive Systems 2004, DIS’04). This article describes the Comit project. This article explores context issues using four examples of scenarios that were created during the project. The development of mobile technology and the increased availability for the users of these products call for products that are easy to configure by the user. In order to design for useful configurability we conclude that the design process needs to be focused on social roles and social contexts.

(Project; Comit)
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Paper One: Playful Collaborative Exploration


Abstract

Within the Participatory Design-community as well as the Computer Supported Collaborative Work-tradition lots of effort has been put into the question of letting ethnography inform design. In this paper, we describe how game-like approaches can be used as a way of exploring a practice from a design point of view. Thinking of ethnographic field work as a base for sketching, rather than descriptions, creates openness that invites co-authoring. The concept of playful collaborative exploration suggests certain ways of interacting with ethnographic material so that it becomes a design material for an open-ended design process. We have carried out field studies, transformed the field material into design material and set up a design game for working with it together with the people we followed in the field. The design game builds on an idea about the power of narratives and the benefits of constraining rules. We believe that this framework for collaboration opens for playfulness, experimentation and new design ideas.

Keywords

Ethnography, Collaborative design, Design games, Work practice based design

Introduction

In this paper we will present how playfulness and games can be used as a way of doing design grounded in ethnographic studies. Rather than aiming at correct descriptions of practice, we try to set up situations that are open enough for viewing practice from different points of view. Such an openness can be subject both for different interpretations, but also for imagining practice quite differently. The way of working in what is described here springs
out of a group of design researchers working with developing environments for inspirational learning for design students. The design group are familiar with how the students work, and as a starting point for design we chose to start by doing a field study from which we created design material to start explore both the existing practice of the students and possibilities of changing that practice. In this process, exploration and change are done in an interweaved process. We will describe what we have experienced as beneficial with “playing around with ethnography”.

Social aspects of computer technology have, during the last decades, become a growing field of exploration. During the eighties, Human Computer Interaction (HCI) focused on “use qualities,” and developed techniques for evaluating computer systems from a cognitive perspective. The ideas were strong, and the techniques have been progressively developed. In the mid-eighties the interest for collaborative work grew and sociologists and anthropologists entered the field. It was within the Computer Supported Collaborative Work (CSCW) tradition that sociologists and anthropologists came to have the strongest impact (see Plowman et al. 1995 for an overview/critic). The HCI approach was criticized for not considering social dynamics. Numerous field studies have been carried out and been reported, all advocating the need for considering social aspects. These studies, on the other hand, have often been criticized for not contributing to the design projects, a criticism that might seem unfair. The sociologists and anthropologists often have a firm standpoint, meaning that they are good at doing studies, but are not trained to do design. Designers are not trained for understanding work practices, and voices have been raised for making use of the specialists on this area: In a debating article Shapiro writes “It seems odd to impose the entire responsibility for the redesign of the work on systems designers while those whose specialty is supposed to be the analysis of work run for cover” (Shapio, 1994). The arguments are all right and correct, but even so the CSCW-community seems to have reached a deadlock.
The game
Starting from the assumption that how one work directly affects the end result, we have worked very deliberately with ways of doing design work, both in education and in our own research. In this section our process will be described in greater detail. The Atelier IST project (IST-2001-33064 Atelier - Architecture and Technologies for Inspirational Learning Environments http://atelier.k3.mah.se/home/) has taken a starting point in participation and work practice-based design. In a time when computational possibilities are leaving the screens and keyboards, design work must adjust to the fact that technologies are mixing, becoming both spatial and virtual (De Michelies, 2003). Contemporary designers have learn to work collaboratively and across disciplines. Parallel to this transition another, perhaps more radical alternative strives to abandon design as problem-solving, and rather turns to an open-ended design process in which the exploration of the design space leads to the outcome of the design process. Taking a starting point in an interest in students' actual praxis, we have done fieldwork throughout student assignments, from introduction to final presentation. The fieldwork has been carried out in a participant inquiry manner. With video and still cameras we have documented a large part of what the students have done during these weeks. When the students did their field visits we followed them. Our role became partly as a more experienced designer and partly as observers.

Figure 2. To the left a plastic card. To the right the card is placed on the tag reader which then plays the digital media in a large projection that can be viewed by everyone.
From our field study we made a first selection of “interesting occurrences”. We picked out approximately 15 short video snippets and 10 stills that showed something that we thought could be interesting to examine. We created plastic cards for each of the video snippets and for each still image. The idea with the cards is that each card functions as a placeholder for a photo or a video snippet and when discussing the photos or videos the cards can be a reminder. The cards were augmented with RFID tags that maintained the links to the videos and images. By placing the card on a tag reader the media were displayed in large projections that could be seen by every player.

Using video as design material or in games has been explored in several writings. Buur, Binder and Brandt gives us some examples of how it is possible to do ‘design in video’, portraits, improvised scenarios, the video card game and video as reflecting material are all ways of ‘maintaining reference to the context’ while designing (Buur et al. 2000 p.28). Buur and Sondergaard developed a video card game that is a “sense-making” exercise where a design group works with a large amount of short video snippets each snippet represented by a paper card with a key frame from the video. Categories grow out of the material and the group arranges the cards to frame design problems. (Buur and Sondergaard, 2000). In Johansson et al (2002) a design gaming approach is used to facilitate collaboration among several stakeholders. In this paper our focus is on how the open ended nature of the games makes out a basis for collaborative analysis that doesn’t privilege simple interpretations, while still offering a rich material for merging ethnography and design.

We invited the interaction design students, whom we had been following, for a workshop. Our intention was to give them a chance to tell their stories of how they work. The workshop was arranged around an explorative design game. The game we played was an associative one, portraying situations, feelings or other things that had become important in the work. The game has no winner. The goal is to investigate and negotiate images of what happened. It follows the structure of an ordinary card game, played for fun. The
participants are each dealt some cards, and play their cards in turn. The cards are laid on the table and, as the common [design] material for exploration, framing an evolving theme. The cards, stills and video snippets were a way of communicating and functions as the mediating boundary object (Star, 1989). In the process of playing the game the cards became more than “mere” representations for the stills and video snippets, they also became the carrier of the discussions that it had been involved in. While the media attached to the cards were from the mentioned project, the player is free to interpret them in any way they want. In the first round all cards are placed on the reader, the content is thus displayed. The first player places a card on the table and gives a tentative title to the story that is to be built. The second player will also play one card and continue the story. A player can also pass, just as in poker, if he feels uncomfortable with the story or if his cards do not match. After the second player the third continues and so on. The game is played until there is a story on the table that the group feel is valid. There can only be four cards in a story, when player number five wants to add something s/he has to choose one card away. The rule is that one needs a good argument for changing the story, and it should add something new. When no more changes are done, the group tries to find a new or refined heading for the story. Each round is completed with a debriefing session where all participants write post-it notes that comment the story.

Figure 3. To the left cards laid out which eventually forms a commented story such as illustrated to the right
An individual researcher or a small group of the research team has done much of the fieldwork. In an ambition to establish a collaborative design process, with participants being equal, we rather than working with ethnographic descriptions as an input to design processes, strive to impose the ethnographic perspective into the design work. Instead of being the ethnographers that interpret and offer understanding and/or "implications for design" we involved a larger design group in exploring the ethnographic material, and using this material to explore the present to see how it could be different. The games were played both internally in the research group and together with the students that were both the object of our studies and future users. The design games we have been working with have rules that are explicit from the beginning, and if the rules are to be changed it has to be discussed as a part of the game. In this way we carefully started to frame the design situation and impose our order to it. In the process of exploration the practice we started to sketch how the practice could be different, when we introduce technology to support the students and their learning. The exploration and the evolution of design ideas are interweaved in a collaborative process.
A game of playfulness
Descriptions of practice tend to be rigid and respectful for a scientific demand on stringency in use of language. The achieved clarity can be viewed as a sincere respect for the users and their working conditions. But ambiguity can well be used in a respectful way that invites different perspectives. As an alternative in design Gaver and colleagues reflects on how “contextual ambiguity can question the discourses surrounding technological genres, allowing people to expand, bridge, or reject them as they see fit.” (Gaver et al. 2003).

What matters for design are only rarely descriptions of space in a physical sense. The spatial layout of a site is of course of importance, but even more so are the activities taking place there. Paul Dourish (2001) uses the distinction between space and place to distinguish what is really happening in an environment. What constitutes place is a complex totality of social engagement with other people, use of artifacts, information and lived experience that is hard to pinpoint. One can view place as experienced space. Design is a process of both recognizing and transforming place. But place is a qualitative phenomena more than quantitative. The phenomenological tradition gives us some tools to approach everyday life by returning to concrete things and occurrences rather than abstractions describing them. Bread on a table is not a meal – it’s also the hands weary of a full day’s work dropping the knife, the children telling stories from school, the remembrance of youth in the taste of an old time recipe and so forth. This richness is hard to generalize in descriptive language since it includes variance and paradoxes as foundational parameters. Our everyday life-world just as work practice consists of these concreteness that falls between the pure objects of science. Understanding place calls for collecting the paradoxes and complexity of life worlds rather than unifying them in abstractions. The concept of playful collaborative exploration suggests certain ways of interacting with ethnographic material that do not constrain analysis in a search for objectified knowledge on user activities. Instead the ambiguous nature nourishes the dialogue between the different actors in the
design process. Design can be to create fantasy worlds (worlds of hypotheses) were designers experiment with ideas and concepts as chemists in a laboratory. The design game we created takes one of its starting points in studies of practice and places them in what we call the design lab. Donald Schön (1983) has described the way architects work and Louis Buccairelli (1994) have done the same within Design Engineering. Schön writes about “design worlds”, how sketches talkback and how a conversation with the design situation is established with the sketch. Buccairelli (1994) writes about “object worlds” as both the physical place where design work takes place and as the mental image that designers creates. In collaborative design processes the search for meaning is a large part of discussions and negotiations. The design lab is a place for the fantasy world and the design game is the structure. This place allows experiments, mistakes, poorly based ideas and so on. The rhetoric of such experimentation is typical as in a game of play-pretend. “The most fundamental experimental question is, ‘What if?’ “ (Schön 1983 p.145). Questions that open for alternative views on how things can be explained.

A goal for the games is to set up imaginary situations that complement reflective understanding of practice. They do so by introducing a playfulness that follows from the non-constraining use of language. The use of games as mediating tools in participatory design processes has been explored, for example, by Ehn and Sjögren. They argue against correctness of descriptions and focuses on how linguistic artifacts are used rather than what they state to be true (Ehn and Sjögren, 1991). The argument is in line with how Wittgenstein (1953) developed his view on philosophical inquiry from language as depicting reality to a focus on how it is used in context. The idea of language games is close to how design games can form foundations for collaborative exploration. Meaning arises not in how exact a statement is formulated, but rather by the intertwining of different voices that shapes language in the specific situation. In this sequence the player Si lays a card depicting the studio the day after a major clean up. While the story is about the changing nature of the studio he has no definite analysis ready at hand, but he “tries the
“card out” and the thread is picked up by Th, another player. An utterance like; “I’m not quite sure what that means” is far from the strictness most often displayed in scientific reports. Instead it's the way the meaning of the card evolves by the engagement of several actors that is important. Laying out the card he is pushing the story without prompting analytical excellence – he's playing around with the truth.

Si: The day after the cleaning it looked just as before the cleaning. I am not sure what that means, actually..
Th: We discussed it quite a lot actually, after the project ended. That it was like a kitchen. In a kitchen, when you cook, it is always messy, and you need to clean up, but just as you cleaned you start over again. You do not clean to make it clean but to create the possibility to make something new. And we thought that it perhaps an image of why you had to clean up.

The goal of the game is to tell good stories about practice and not to achieve an ultimate description. Narrative styles of analysis of ethnographic studies are a discipline of inquiry in itself, which will not be thoroughly reflected here. Howard Becker (1998) advocates asking “how” rather than “why”. While “why” seems to prompt for answers without logical inconsistencies, “how” encourages a more straightforward storytelling. This makes part of the playfulness that eases up participatory design processes. While analysis can be interesting and engaging the participation in games that aims at design improvements requires having fun. In the last years more spectacular methods for inquiry and collaboration, inspired from other domains than science, have been explored. Much attention have been given to the concept of cultural probes developed by
Gaver and colleagues. They transformed the situationist movements use of psychogeographical maps into a package of devices for “self-recording” that were handed over to the users, which under quite playful forms made different annotations and recordings that were returned to the design team. The designers viewed the collected material as inspiration rather than information (Gaver et al. 1999). Other art movements have generated likewise speculative methods for collaboration in the forms of games taking place during face-to-face interaction. Originating from the idea of autonomous writing the surrealists borrowed methods from academic disciplines such as sociology, anthropology and psychology to elaborate methods in the form of games for exploring the mechanism of imagination and intensifying collaborative experience. They subverted academic modes of inquiry to undermine rationality and invented playful procedures to release collaborative creativity (Gooding and Brootchie, 1991). An example is the game of Exquisite Corps, which made use of open-ended fragments. Drawings were made on a piece of paper that were folded in a way that showed only a part of the drawing and the next player continued the drawing on basis of what he could see and then passed it on to the next player in a similar way. The open-ended nature of the cards in our game is of course the foremost reason for complexity of interpretation, but at the same time the strength. They are representational artefacts and they do carry a portion of evidential content. Augmentation of the cards is crucial. They are not symbolic game pieces, but before being placed on the table and into the story the content (video clips, still images) must be displayed to everyone in the game. But they are not stereotyped statements; rather they are placeholders for different voices and trying to create situations where different perspectives can meet. The mesh of different professional, social or ideological perspectives and interests is typical for design processes. Many professionals and researchers (Star, 1989; Saunders and Dandavate 1999) have made interesting work on different methods for using objects as mediators in participatory design processes. It is not only a question of blending the different perspectives, but also to create a situation where the participators can step in and out of their own perspective. While watching the
media participators can immerse in their memories of the occurrences. As the conversation continues they can reflect on what has been viewed from what has been coined as an analytical distance (Karasti, 2001). At the core of the game is to try to build on visions of the others. The final story lies ahead and must be negotiated.

The “passing it on – catching it” nature of the storytelling allows different stories being told on the actual observations, but they do not explode in any direction. As the game succeeds the group narrows down a version of the story and the rule that says that some cards can be exchanged at the end of the story increases the experimental space. In this fragment the use of different material in the studio is being discussed. Player Be thinks that she's not adding anything to the previous cards, but she's encouraged by the others in two aspects. Player Ol affirms that this is something different to her and player Fr, who now has got a good knack of the rules, reminds that what is being played can be changed later.
To us the hybrid nature of the cards makes an interesting prop or boundary object. The physical side of the card acts as gesture. Many observations were made on how cards are fingered while thinking, waived while articulating, turned towards a specific player while exchanging arguments and so on. They also form physical nodes in the hypertext that can evolve in the game, something that persists in the room and can be manipulated to have other meaning. The virtual content grounds the storytelling, you can test meaning out, but any player can argue on the content. So while being representational of practice they are still subject for structural change. Lucy Suchman (1995) writes on the crafting of representations of work and how normative accounts by definition represents typification. She makes an important point in stressing that maps and representations are created from a specific location. Ethnographic data not only carries a lot of noise in themselves, but the selective way in which it is merged into mappings can never be free from value and interpretation. In collaborative design it is the design participants that needs access to the field material. Those that are expert readers of field material within other traditions are not per se good readers for a design project. Reading field material for the purpose of design, needs the perspective and attention for details that ethnographers have developed. The design game we developed tries to create the preconditions for this, which is quite a task, and yes…it should be fun too.

**Rules of Freedom**

In this section we will go in some detail with how we have set up the (pre-) conditions for the playful collaborative exploration that we are arguing for. The starting point for this paper is the relation between ethnography and design, a relation that if wanted has to be created.

Designing and playing games have many similarities. To use design games as a way of setting up a design process is a way to being able to choose what to focus on. Habraken and Gross (1987) made a report about a number of ‘concept design games’ they had developed. The games were used as a tool for research in design of built environments, the aim being to improve the design
communities working on buildings and urban environments. By observing the games being played they studied how designers manipulate and transform artefacts during a design process while making agreements and rules about how to go about their work. By developing a set of games Habraken and Gross managed to isolate and focus on ‘single aspects, each giving a clearer picture of what just some of designing is about’ (1987 p.1-2 – 1-3). In our work we have picked up on the gaming idea, and created a set of design games that set focus on certain aspects. Our ambition is not to study design, but to impose preconditions that 1 sets a perspective on designing and 2 creates a ground for collaborative design work. Here we will illustrate how an exploration of a design domain can be carried out as a game. In the following example we can see how the cards are given meaning by the participants. From the look of it, Ja (in A) made his selection of card based on the label. The next card was also chosen from the text written on it. Fr finds that he expected one thing from the video connected to the card, but finds that the content was something else (in B).

A

Ja: I have a good beginning. First I want to see what it is.. It is the first day.
Bella: The first day
Thomas: Did it look like this?
Jan: Yes, the first day when we did not knew what we should do.
Be: I can’t remember that it looked like this. Yes, this was the first day when you presented. Then we still had a great distance to the room, still.
Th: So what is the story?
Ja: The story is.. Before we knew anything. When we were to find out what we should do, this became an introductive state. And from this it was shaped further.
This is collected from the beginning of a game session, the first two players starts with the headlines of the cards in A “the first day” and in B "everybody looks, no one sees". In B the person that chose the card realizes while looking at the video snippet that the clip is about something else than he thought, the group then rearrange the story. The situation and the openness of the interpretation allow other participants to take part in the exploration as in B. The outcome of the "everybody looks, no one sees"-card is a combination of what the card says and what the group remembers from the beginning of their project.

To use games like described here is a way of driving the exploration as well as the design process. It sets the rules for how to collaborate, and for how a “theme” is established. But it is also a process that makes resistance. If you want to say something that lasts it has to be said with the video cards and including something new is an act of negotiation. If a new aspect of a theme is introduced it starts new discussions. We can see from the work with the game that the setup with physical re-presentations makes the participants continuously connects back to earlier discussions, pointing at stories created previously and referring back to earlier discussions about a card. Using games is a way for us to set up the
rules, and we use this to open for collaboration and to lessen the power differences between people. The game metaphor is well known which means that we do not have to concentrate so much on procedures once the game is going.

The exploration that we suggest here has its basis in design work and in making changes. In comparison to more descriptive explorative practices, such as Interaction Analysis (Jordan and Henderson, 1994), this approach is more open in the sense that practitioners can bring experiences that are not immediately visible in the video snippets or the stills. This approach does encourage multiple interpretations to broaden the view of the practice explored, whilst more descriptive traditions tend to stay with creating one account. Even thus the purpose of the exploration is different, what it-designers has acknowledged is the “turn to the social” (Grudin, 1990). We want to adopt the turn to the social as an ethnographic perspective brought into the design process. The perspective is represented by a way of working, assuming relevance of the video material and still photos from the study, and sensitivity for what we can learn from the material.

The role of the game facilitator becomes visible in the next selection. In D Be comments what Ol has played out by saying, “to take over the room”. Being the facilitator Th repeats this statement and continues, “that is rather good” later he also refers back to what Be said in A by stating “I can’t recognize it [the room] either”. This way of repeating, what he finds, important helps the group in hanging on to what has been said and what the story is about.

| A | Ja: I have a good beginning. First I want to see what it is.. It is the first day. |
|   | Be: The first day |
| Th: Did it look like this? | Jan: Yes, the first day when we did not knew what we should do. |
|   | Be: I can’t remember that it looked like |
this. Yes, this was the first day when you presented. Then we still had a great distance to the room, still.

**Th: So what is the story?**

Jan: The story is.. Before we knew anything. When we were to find out what we should do, this became an introductive state. And from this it was shaped further.

D
Ol: Here it has begun.
Be: To take over the room.
Ol: Yes, exactly. To get to know the material, somehow.
Fr: You could exchange the one I put out.

**Th: You could see it like this: If you take these two as extremes. ”to take over the room” that is rather good.. I would also say when I look at this (pointing at the card Ja put out) I can’t recognize it either.**

Th who acts as the game facilitator tries to open up the interpretation and suggests another look at the card (the media) by asking “Did it look like this?” and later “So what is the story?” (in A). The facilitator role is about making the participants look thoroughly at the material and make them tell about what they are thinking. At the same time he summarizes what has been said so far. The facilitator has to balance between running the game and letting the participants have control. The game is set up so that no single participant can dominate the story. How ever own ideas and creativity can be seductive, and every now and then someone is pushing an idea hard. In this design game session one of the participants started the round and wanted to keep the theme he had initiated. The first thing that happens in the game is that Ja is playing forward a card with the label “the first day” (in A). By this Ja suggests a chronology, in the end of the round, Ja still
thinks of this game as a chronology when he presents an ending following the actual process.

Ja who starts the game has a considerable impact on which way the game goes, still he is not in control of the story. In the last frame from this fragment he tries to bring the story back to where he started it, but the story is at this time “ready”. To much has been said, and an interesting aspect has grown out of it. At other occasions the game facilitator has stopped the game explaining, “wouldn't it be a pity to ruin this story”, and that could very well been suitable here. However the group had such strong consensus of what the story was about that it perhaps was not necessary. The structure of the design game becomes a part of the design material, as a collaborative sketch. Schön and Wiggins stress the importance of the medium in the design process. Design artifacts such as the sketch reflect design “moves” so that designers can see the consequences (intended as well as unintended) the move gives (Schön and Wiggins 1992). The design game is a way of building stories. The format is a durable and available sketch. The process is one of co-authoring and the stories are owned collectively. The material is the narrative physically represented by the plastic cards and the media it links to. The material of the design game can be viewed as an alternative way of making sketches. Video is engaging and a highly participative medium and therefore it has great value when being used in collaborative design sessions. Material that comes out of a field study helps the designers relate to the context they are designing for. The plastic cards are tangible and easily available and easy to manipulate.
Conclusion

In this paper we have presented the idea of using games as a structure for playful exploration of ethnographic material for design purposes. As a contrast to most of the work done to inform design with ethnography, we have studied a participative exploration done in design sessions. Placing our approach between the ethnographer that creates a detailed description but ‘runs for cover’ and the more artistic approaches that let their material from an inquiry function for inspiration, we have found a balance between grounding design work in existing practice and creating necessary distance to the material. We describe a design process that is explorative rather than problem oriented. This alters what is useful and results in ways of working that differs from more descriptive inquiry approaches. We are searching for possible future practices and what we need is fragments that can say something about how things are done and that has a character of being building blocks to build stories out of. The story becomes a sketching material, and the material that we can carry out experiments with.

The design game and the rules of the game is a way of getting structure in the collaborative design work. The plastic cards have the function as placeholders and mediating objects. Since they are augmented and carry links to digital media, which can be immediately played and viewed collaboratively, the actual field recordings have a strong presence in the game. The story creation is central in our design game, and co-authoring is fun and broadens the perspectives.

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Paper Two: Partner Engaged Design
New Challenges For Workplace Design

Abstract
The spatial organization of the workplace affects the work going on there. The technology used, changes the work practice. This paper describes a design process where different aspects of workplace design for project-based office work have been combined into one multi-stakeholder project, integrating the spatial aspects, the furniture, the information technology, and the IT-services that are connected to work.

To have several different partners with different interests and competencies collaborating in a future oriented design process puts certain demands on the setup of the process and the tools being used. Taking a starting point in existing work practice, we have driven this project with techniques most often used for user-involvement. Scenario building played a crucial role in tying the process together. The concrete result is a completed concept proposal for an actual “office of the future” layout, which integrates advanced information technology and service solutions. The case shows that it is possible to reach innovative consensus-anchored results with the described design method.

Keywords
Workplace design, Work practice based design, Collaborative inquiry and design, Architectural design,

Introduction
The process of designing new modern workplaces is more challenging than ever, and new ways of working are needed in order to overcome these challenges (Cash 2001). The challenges are rooted in the fact that today's companies have to operate in societies in rapid and continuous change where the introduction of
new, better and faster technologies together with the increasing international competition calls for business concepts, employees and workplaces that can react fast on these changes.

As technology becomes an increasingly important part of the activities carried out at work innovative workplace design is no longer just a question of architecture in the sense of spatial arrangement and furniture. Instead of a linear and successive design process we argue for a process that simultaneously take into account the physical space, the furniture, the technological support and the activities that are going to take place within the workplace. Such a design process is difficult to carry out, as it requires that people who have competencies within various fields work together on the same design task.

Within an action research format we have explored the idea of a "Design Lab" where people with various competencies regularly meet and inquire into workplace design issues, develop workplace concepts and explore representations of these as-if workplaces in a collaborative setting. This paper reports from a project where we, together with four different industrial partners and a group of office workers collaboratively developed a concept for an "Experiment Office", a working prototype for an “office of the future”.

Background
In the seventies the issue of participatory design was focused on democracy. This was in correspondence with the development within the rest of the society, and the rise of an engagement and awareness of good work environments. The role played by the workplace designer was to let the employees feel that their input had been taken care of and at the same time represent the client so that she/he still as in control of the overall process. Later architects became increasingly aware of the relevance of involving employee knowledge and competences. This resulted in more influence and valuable knowledge to the design process. The designer's commission now was to interview or collect data from the employees as they where regarded as the main source of
information about their own needs. These participatory design methods made it possible to better examine and fulfill the employee's explicit requirements about their work environment. The employees participated in order to communicate information and demands about their outspoken needs. The designers main concern was to ask what they wanted and from this information design proposals were made. (Granath 1996) Mental images of one's workplace and how to design it seems however to have a power to persist even when the foundations for their existence have changed. The result thus often tends to be a confirmation of the users preconception of what their work environments used to look like As a consequence one often sees that, despite the often dramatic changes in work practice imposed by among other things the new information and communication technologies many organizations and corporations choose, actively or passively, to work in traditional and rather stiff spatial structures.

The Collaborative design lab
New ways to carry out the process of workplace design, especially in the early conceptual phase are required (Duffy 2001). The concept of collective or collaborate design has been introduced in several fields (Ehn 1988, Granath 1996, Horgen et al 1999). Our goal is to develop a design process that integrates today's complex and fast changing conditions and the multi-disciplinary partners who are engaged in the work of shaping the modern workplace. The workplace of tomorrow will more and more be developed together with the users who are in the center of change, and who are the holders of intimate knowledge about new ways of working. This demands a design process that can create a “Design Lab” which integrates users, external partners and designers, and that offers new tools to support collaborative inquiry and design.

Partner engaged collaborative design
In a partner engaged collaborative design process different stakeholders and users are involved actively in the design work. With this concept we are talking about three aspects of the design process. We put emphasize on who is attending, on the role of acting (engagement or just participation) and on how it is carried
through. In our concept of the Design Lab the design process is individually tailored for each project and is based on a series of structured design workshops with focus on collaborative inquiry and design (Brandt, 2001). The workshop participants use various tools and design artifacts, such as video cards, boardgames, scenarios and interactive digital VR visualizations, that have been developed with the purpose of promoting creativity and facilitating common understanding of the design problem.

A partner engaged collaborative design process develops new concepts through joint interaction and dialogue. It includes active collaboration between users, different stakeholders and designers. It builds on collaborative observation, inquiry, design and evaluation as ways to understand work, and advanced visualizations in conceptual design and scenario building. The partners play an active role in exploring existing workplaces and the making of new work environments.

Opening up the design process by involving a diverse group of stakeholders complicates the design work. Understanding each other is often difficult when the participants have various competencies and perhaps various professional languages. Differences in interests and responsibilities can give rise to conflicts. Furthermore, if people are involved at different times and with varying intensity, an important issue is how to continuously build on previous work and insights gained. Thus in order to succeed with a design process involving many stakeholders with various competencies, interests, and responsibilities, the design process itself has to be innovatively re-thought.

**Shifting focus from design tasks to design events**

Both within workplace design and engineering design authors have stressed the collaborative aspects of design work (Horgen et al, 1999, Bucciarelli, 1994). When describing the social process of design work Bucciarelli introduces the term "object worlds". Object worlds describe the physical space including the artifacts within which the design work takes place. Object worlds also describe the mental "images" that the designers create in their minds as well as
the actions they perform as part of their work. According to Bucciaralli an important part of the design process involves communication, negotiation and entering compromises. He argues that even though compromises are made each person still has her own perception of the design task and that this is rooted in her special expertise and responsibilities. Blessing (1994) has thoroughly examined the literature published on the product development process during the last century. Blessing finds that there is a poor match between the prescriptive models of the development process and descriptive studies of design work in practice. She identifies two main sources of these discrepancies. First she finds that prescriptive models are generally based on a decomposition of design work into individual design tasks governed by fairly simple models of individual problem solving of utilitarian choice rationality and such individual problem solving activity is hardly traceable in empirical studies of design work. Where these have been particularly closely studied, the design work of individuals seems rather to be highly opportunistic and socially situated (Visser, 1990). Secondly Blessing points out that prescriptive models tend to associate the progression of design work with a well-defined transition from one development phase to the next (for example the transition from concept design to detailed design). In the empirical studies such transitions are found to be unclear and often arbitrary, indicating that actual design work is iterative and exploratory. A possible consequence of Blessings studies is to shift focus from the completion of (individual) design tasks to the staging of (collaborative) design events, when organizing design processes. Such an approach is particularly relevant for a partner engaged design process, because design work here is situated at the fringes of each of the partners own development organizations.

**Participation and reification**

Wenger understands collaborative work as an alternation between participation and reification (1998). In his study of work in insurance companies, he describes how clerical workers alternate between discussing and constructing legal arguments based on the evidence in a particular case in a participatory fashion, and acting
based on the groups reified standard exemplars. Elsewhere, he has suggested a similar pattern in design work (Wenger in Binder, 1996). Schön (1983) describes the process of designing as a conversation with the materials of the design situation exemplified with the sketching architect going through a cycle of seeing-drawing-seeing in her engagement with the plan and section drawings of her trade. In a collaborative design session bringing together a diverse group of professionals, each with their own practices of framing and representing their respective design games, it is not obvious how such a conversation can become a collaborative endeavor, and the alternation between participation and reification has to be taken into account. A number of authors have suggested to see these design sessions as a meeting of language games, and have argued for the need to create shared design artifacts that can span the gap between these language games (Ehn 1988; Bødker 1990). Studies of collaborative design practice indicate that such shared artifacts should be seen as what Leigh Star (1989) has termed boundary objects. They may be shared but they do primarily tie together the different collaborating groups by allowing for different interpretations within each sub-community. Henderson (1999) has studied the use of assembly drawings in the engineering factory. She finds that these drawings play an important role in tying together engineering work, as they are circulated between the different groups in the factory. As they are circulated they get annotated and modified, and in this way they carry the imprints of their interpretations. She calls the drawings, conscription devices as they form the glue that ties the activities of the different groups together. For a collaborative design session to be successful we therefore have to look for design artifacts that enable joint “conversations” at the same time as they allow for plasticity and ambiguity that make them suitable boundary objects.

“The Experimental Office” – project

Together with a consortium of four different partners (a supplier of IT hardware and software for office environments, a telecommunication company, a furniture manufacturer and a real estate company) the Interactive Institute has been setting up an
Experiment Office for the future. It is a work environment where different project organized companies will be invited to try new workplace arrangements and technology. The Experimental Office will be equipped with technology from each of the partners involved, and it will be a full functioning office that one or two workgroups temporarily inhabit and use. The office is thus intended to accommodate for actual office work. Our role was to organize and facilitate the concept development process of the Experimental Office.

The design work was organized around three workshops. The first aimed at setting the “stage” for future office work, the second introduced the “props” for supporting activities in the form of IT products. At the third workshop we arranged for the participants to stage scenarios of new work practices from the perspective of the individual worker.

From a research perspective the project posed two major research questions. First the partners where by a large typical business representatives of their respective companies. We wanted to find out if a practice oriented and collaborative design process along the lines suggested in the literature on participatory and user-centered design would make sense in such a setting and what kind of sense
it would make. Secondly the project focused on developing new design solutions at the intersection of the different competencies of the companies involved. This raises the question to what extend competent design work can be accomplished in collaboration where no single partner is solely in control of this integrative design task. For research purposes all design event were videotaped and all design artifacts collected for analysis both in debriefing session for the research teams immediately after each event and for later more detailed analysis. The research approach was also informed by action research in the way that the contributions of the research team both in terms of setting up subsequent design sessions and creating relevant design artifacts such as particular design games, were informed by the analysis of earlier events.

Seeing the future in existing practices
In order to root our design process in existing experiences and practices we started out by doing ethnographically inspired field studies of three selected office environments.

2. The design material (video, photos etc) is grounded in existing practices of project-oriented offices.

In each office one person took the role of a user representative in the coming collaborative design work. It was important for us to bring the voices of individual persons working in offices to the front throughout the process because of the large number of stakeholders with different perspectives involved. For each office
site a collage of video clips was assembled revealing experiences, positive and negative, from the current work environments.

The work practice study that we conducted was a mixture between ethnographic studies using video to follow work activities and a more “work archaeology” oriented approach where documentary material such as ‘work books’ compiled from work place walkthroughs are used as “discussion triggers” in collaborative inquiry settings.

Inspired by the notion of video card games (Buur and Søndergaard, 2000) the materials from the practice studies were edited for a simple boardgame like design game, where participants can use fragments from the studies of existing office practices to create ‘stories’ of new office environments. For each person we had followed, we created a small edited video portraying this person with particular emphasizes on the way she/he relates to her environment. Out of the remaining material we made 40 so-called ‘set pieces’ – small video snippets that sought to capture a certain aspect of the office setting. The set pieces and video portraits were each represented by a small laminated picture that could be placed on a ‘gameboard’. The gameboards were intended to be fairly generic conceptual maps with labels such as ‘important things in the middle’ (concentric circles), ‘everyone will sit by the window’
(an outlined square frame) or ‘many centers’ (several radiating circles).

With this setup the participants were asked to collaboratively create images of future office environments using the portraits, the ‘set pieces’ and the gameboards they found relevant.

4. In workshop 1 all groups choose a game board where the important things should be placed in the center.

In our work the result of the study is not treated as “data” but as something to collaboratively explore and work with to build visions about the future. Many authors have argued for the relevance of letting practice studies inform design (Blomberg et al 1993). However Plowman suggests making the process “informing design” explicit (1996). Gaver et al. describe their design material for instance postcards and photos describing everyday activities as cultural probes (1999). They see such materials as purely inspirational and use it “to play around with the truth”. The approach has some resemblance with what we have done. We let the workshop participants work with the design material as they find it suitable from their competent view. But it is in our case not merely to “play around with the truth”, but rather to use “true” images of existing practices as “building blocks” for visions of the future.
The story about 22

“22” does not tell all readers the same; there is an ambiguity in what it represents, until there is an agreement about it. In one of the workshops a card (number 22 of 40) was used to represent a wish or opinion in one of the groups working with framing the design problem. The card had a picture of a meeting room with a conference telephone. The participants used it as a representation for a “soft meeting room, for low tempo meetings”. The discussion initiated by the card was that there is a need for different kinds of meetings and therefore different meeting rooms.

The soft meeting room was explained as the place where ideas could be generated and books could be read. Meetings that should be held short needed another setting and should be held elsewhere. As the work went on, the participants often referred to “the 22” and held the card up, while they discussed how things should fit together. When they did this it was obvious that they did no longer just talk about the “soft meeting room” but referred to the discussion that they had in relation to the “soft meeting room”, concept. The workshop participants made the design material their own and transformed it into what they considered important.

Offside

During one workshop the ‘gameboards’ played a rather important role of making the participants take stances to the design material. In one of the groups a discussion about what was wanted and what was definitely unwanted arose, this resulted in a change in their
gameboard. The participants created two “offside-corners”, one for things that just should be removed, and one where they placed things that should be available but not in the same way as we currently know it. In this case the participants actually extended the ‘rules of the game’ and imposed a new complementary scheme of ‘what is in and what is out’.

**The role of “work practice” in design**
In contrast to Gaver et al (1999) we claim that the design material used in the way described above, not primary works inspirational, neither does it play the role of being informative, as “hard data”. It is an open grounding that functions as an explorative and creative starting point for the design work. At the same time it sets some restrictions on the design assignment, restrictions created by the work practice based design material. The design material makes interventions in the design process. It pops up when it is not expected and initiates exploration of different aspects. When one group was presenting a first idea about what they found important, a participant from another group jumped in and said “On the video we saw that R argued that he sells best when he is walking around. How does that go with your idea?” The group that were giving their presentation had not thought about this, but could immediately tell us about a project where wearable computers were used by electricians on the move. The technical solution was perhaps not the most appealing for this project, but gave an insight in alternative ways of using digital technology.

**A collaborative story - future office work**
The design process stretched over four months posing the problem of establishing and maintaining a shared understanding of office work among a large number of stakeholders. Substantial efforts are required to support continuity between collaborative events in a process with many stakeholders. Preparations before collaborative events become crucial to provide a starting point where the stakeholders different perspectives can be brought together. Also, after an event there is a need for analyzing and summarizing results and bringing them back to the stakeholders, bridging over to preparations for the coming collaborative event.
Setting the stage for future office work

After the first workshop where the participants had produced their first gameboard collages of a stage setting for future office work, one of the architects in our group interpreted and summarized the results. She transformed the collages into representations of three different “stages” for office work on a conceptual level. Each conceptual stage displayed the main characteristics of the results from one of the groups, and they were given metaphorical labels to reflect these characteristics: “the path”, “the eye”, and “the nerve centers”. For instance the stage named “the path” showed a public path through the office to which various kinds of meeting, work...
and project rooms were attached. Along the path previous products were also exhibited. “The eye” concept was based on the idea of a public area (the eye) where the organization met with the outside world (front-office) and a private and more quite area exclusively for the employees (back-office). “The nerve-centers” illustrated an organization having several projects running simultaneously and where each of these had their own center namely the project room. Around each project room functions such as copy machines, areas for quiet work etc. were found.

**Reifying the object world of stage-setting**

In order to support the continuity of different stakeholders perspectives we provided each partner with a rich description of the results from our collaborative effort in setting the stage for the future office, together with the input material to the workshop. An HTML-document was developed that presented the architectural interpretations of the results from the three groups, video-snippets showing highlights from the collaborative design work including presentations of final results, and finally the forty “set-pieces” (images and video-snippets) used as input to the workshop. The material was distributed on a CD-ROM to all stakeholders. The intention was to provide a reification of the first workshop's object world including its results and this way support continuity in the story of the future office. Most important, the material also helped newcomers to enter the design process. However, as the reification of the workshop was based on our interpretation of the results it was important for us to present and discuss these interpretations with each partner before moving on. The partners were therefore visited to get their view on the material presented.
Introducing technological-props

In preparing for the second workshop we needed to provide a bridge from the three conceptual “stages” from the first workshop over to the technological “props” to be introduced in the second workshop. Based on the stages in the first workshop a two-dimensional matrix was formed to categorize the technology introduced by our partners.

<table>
<thead>
<tr>
<th></th>
<th>Mine</th>
<th>Ours</th>
<th>Everyones</th>
</tr>
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<tbody>
<tr>
<td>Small</td>
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<tr>
<td>Medium</td>
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<tr>
<td>Large</td>
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</tbody>
</table>

8. A matrix corresponding to Weiser's visions about ubiquitous computing.

One axis described how individuals would relate to the technology. We wanted to cover technology support for the individual and the designated group as well as the office as a whole, and the options were labeled: “mine”, “ours” and “everyones”. We also wanted to introduce a notion of scale in technology, and the other axis divided technology into three simple size categories: small, medium and large. The size categories roughly correspond to the ones
introduced by Weiser (1991) when describing the technology scale in ubiquitous computing.

With the matrix as starting point we discussed with the partners what kind of technology they would introduce in the second workshop as “props” for the future office stage. As the “experimental office” was a facility being brought into full operation within a year, and we wanted our conceptualizations to be firmly rooted in problems and success stories from existing practice, the time frame of our future visions was rather short. From a technology perspective this meant that we limited the selection of “props” to existing products, or products being rolled out within six months. The other part of preparing for the second workshop was to ensure continuity in issues from the user organizations. During our visits we created basic scenarios for each participating user.

**Creating scenarios about project-based work**
Creating scenarios can be central in tying the design process together (Brandt and Grunnet, 2000). In the workshops part of the task was to create scenarios collaboratively. In the end of the workshops the groups presented a scenario as a short story about what took place within the future project-based work environment. At the second workshop the groups created a story based on activities that each of the users did during a normal workday. Three groups were formed around the three users. They were the main characters in the stories and played a central role during the group work. H.’s group worked with the conceptual stage named "the eye". H is a consultant. She is almost always on the move and collaborates with several people both inside and outside the organization. At present she uses the telephone quite a lot. H takes one of the blue plastic pieces labeled "everyones" and put is on the "eyeball". She says: "If I translate my present work place with this the entrance is here, and I sit here". She takes one of the red plastic pieces labeled "mine" and places it at a distance of the entrance. She continues: "Usually we like to show our customers the office because we think it looks good and we are proud of it". Then she says: "So we use to walk a little tour in the office. On this
office space the round would be here and the meeting room would then be here”. She pointed to the paper while explaining. Later the group discusses technology support. H. stresses: “As we are very often out of the office I and the other consultants need technology which allows us to go into each others mailboxes and to send mails in each others names”.

9. In workshop 2 the participants built scenarios for the abstract “eye gameboard”.

Envisioning the Experimental Office
When IT professionals, furniture designers, facility managers, architects and telecommunication developers are embarking on a joint development of an experimental office, it is not likely that they will ever express their design in compatible terms. The IT professional may describe the office as an ideal setting for his concept of personal area networks. The facility manager may describe it in terms of its congruent basic structure providing opportunities for flexible adaptation to changing needs. And the furniture designer may put emphasize on the novel integration of interaction technology in the core furnishing elements. On a conceptual level these differences can not be reconciled without giving up the different professional perspectives (that motivates the collaboration in the first place). On the other hand there is only one office to be built and as each of the participants one day will pass through this environment, it will give raise to all these different stories.
Earlier work where we have been engaging various visualization tools in collaborative design of architectural spaces has shown that visualizations that allows for an immersive engagement with an envisioned environment creates a fruitful ground for joint evaluations even with very diverse groups (Fröst et al., 2001). The enactment of design suggestions in formats enabling participants to confront the design artifact with what could be called a participant or full-scale perspective immediately evokes contextualized appropriations. Different participants still perceive the design artifacts rather differently, but they can literally point to what calls forward their appreciations. We have also found that establishing such an “immersiveness” is not particularly dependent on overtly naturalistic representations with for example photo realistic visualizations of an architectural space (Fröst and Warrén, 2000). Of much greater importance is the possibility to explore the design artifact without a preconceived conceptual scheme.

If immersiveness provides a common ground for appreciation of design moves, it is however less supportive for new moves. To productively engage in design conversations participants need access to more birds-eye-like observer perspectives that enables them to grasp a conceptual totality which is not available when immersed in a particular design vision. In the different professions such conceptual sketching tools are well established whatever it is the architects diagramming or the system designers flow charts. For designers collaborating across professional boundaries new but corresponding concept design games has to be established. As proposed also by Horgen et. al. we have found that various boardgame-like design games suggesting basic play with the spatial ordering of elements, are interesting formats for collaborative sketching activities.

In an earlier project we have developed a visualization tool: ForeSite Designer, where we have attempted to accommodate both perspectives. ForeSite Designer has an interface for placing and spatially organizing geometrical elements on a 2D surface. At any
given moment this configuration can be compiled into a freely navigable 3D visualization (based on the widespread computer game Half Life). The 3D world created can be explored very much the same way as a conventional “shoot-them-up” computer game. In the Experimental Office project we have used ForeSite Designer throughout all design sessions.

9. The participants created stories within a chosen 3D scenery with ForeSite Designer. The sceneries where equipped with technological props.

A snapshot: From boardgame to 3D world
At the first Experiment Office workshop mixed groups are gathered around a table. In turns they have to pick a picture from a pile of forty pictures from an existing office environment. They

10. Building an actual concept for the Experiment Office. Walls, Furniture, Technology, Persons- All have its own representation. A plan drawing from one of the groups in workshop 3
explain to the others why they have chosen that particular picture and together the group views a small 1-2 minute video associated to the picture. Afterwards the one who have chosen the picture has to place it on the board. The board has concentric circles in different colors. Camilla has chosen a picture of a room for relaxation. She places it at the periphery. It must be away from the busy areas, she explains. After a while the board is filed with many pictures, and the notion of center and periphery has been heavily negotiated. Two things stand out. The center should be like the heart of the office. Here past and present projects must have visibility and people should gather here to work collaboratively. The center is also where you bring in close customers to make them see the trophies of the past and make them engage in future challenges. Radiating from the center are more diverse areas of individual work and contemplation. An overall zoning is seen as “slices of a cake”.

After some hours the board configuration has to be entered into the 2D layout of the ForeSite Designer tool. An initial “visit” to the 3D world of ForeSite Designer shows the group two new issues to deal with. The floorplan is rectangular with no markings on the floor and the entrance is in one of the corners. The group starts discussing and writing on the white board. Could the center be “dragged” towards one corner? What about the “edges with a view?”. The pictures are one by one placed on the 2D layout. A configuration later called “The Eye” is emerging with a steep and short entrance zone and a considerable depth partitioned in three different “slices”. The deepest zone for the most part without direct access to the windows holds the common functions: copier, meeting rooms and towards the far end (with windows) relaxing area. The two symmetrical zones along the window surface hold project work areas, soft meeting areas and individual work places. On the 2D layout things start to looks pretty good, but after yet another “visit” to the compiled 3D world new problems arise. The center of the “Eye” is surely interesting and the adjacent areas where the three slices come close provide interesting opportunities for functional crossover. But further into the space the “Eye” does not impose sufficient order. New suggestions come up. Perhaps small
clusters forming concentric ribbons along the perimeter would be something. The group turns back to the table with pictures and the 2D layout to work it all over again...

**Making it concrete: Respecting constraints**

In the preparation of the third workshop the research group was discussing how we could sustain continuity from the other workshops. A suggestion was that the sketches made after the second workshop should be redrawn with the up-coming workshop in mind. However, this suggestion was rejected, and it points at something interesting. The project had moved on both on the design concept level as well as on the strategic administrative one. The location for the future office had been decided, and the diagrams that were used earlier would not be applicable between the walls now setting constrains for our design work. To continue with the same diagram concepts would be to ignore the particularities of the chosen location. The new constraints set by the actual building became something that made the project come into a new phase, where the participants realized that the process would have to come to a closure within a rather short while.

For the third workshop we chose to be very explicit about the restricting constrains that we had. We made 2D architect drawings and in the 3D world we adjusted the setting so that it corresponded to the actual building for the office, we took photographs of the view from the office and inserted these as a background outside the windows in the office. The building blocks we used inside the 3D office was still sketchy, just representations of “what could be”.
The clear distinction between what was possible to work with and what was already decided was important to us, to get the continuity of the project and give the participants a feeling of getting forward.

**Discussion**
Modern workplace design demands new design methods. Innovative workplace design is no longer just a question of architecture in the sense of spatial arrangement and furniture. Technology has to be designed simultaneously and be integrated with spatial design. This will be even more so in the future, when interconnected technology, in line with the vision of “ubiquitous computing” will be part of work place design.
The Experiment Office project has explored approaches for collaboration in multi partner, cross competence design processes. The goal was to create a successful "Design Lab" for collaborative inquiry and design. The design work was grounded in collaborative inquiry into existing project-based work practices and from that an innovative concept for a future office workplace was developed. The grounding exercise with the video cards made it possible to *identify and play around with* important office "set-pieces". To start a collaborative inquiry and design process we will argue that components at hand to play with are important. The cards and video snippets speeded up and concentrated this process. They constituted a common ground and frame of reference for the participants by trigging individual comments which where processed in shared exploration and reflection. In this way the "set-pieces" and later the other design materials where identified and associated with collectively agreed connotations.

The boardgames and other design material forced the participants/players to make *priorities*. For instance, in the first workshop the groups had to decide if the "set-pieces" where to be considered as important or not. The groups had three different gameboards to choose from, where the important components were supposed to be placed differently - in the center, in several centers and along the windows. At this stage in the design process it was apparently difficult to make more elaborated distinctions so all the groups chose the one with the important components in the center. The introduction of the ForeSite Designer interactive design tool...
opened up for the possibility digitally to relate the components spatially to each other and to build 3D spatial arrangements with the components. At first this was done rather schematically but in the later workshops it was possible for the participants to build up the detailed scale models integrating space and technology. Collaborative scenario building helped in tying space, technology, and work activities together. They filled the office spaces with meaning, made non-fits manifest and initiated change and development of the elements and their relations.

To succeed with setting up collaborative workshops that involve a diverse group of people with various backgrounds and interests requires that each person can see a purpose in participating. In the "Experimental Office" project the partners and the office work representatives had a joint mission to design a concept for a future office workplace. Everybody had different views of what constitutes an office and what is taking place there. Still this was what tied them together. We made use of this as a starting point for the design work, and created therefore design material based on work practice studies.

This design material created a common ground that everybody could relate to but at the same time they acted as things to think with. The staging of the collaborative workshops made it possible to play around and create stories with the work practice based design materials. The design materials functioned both as grounding for the design work and as a boundary objects wherein different participant can read and interpret the material differently. In partner engaged design it is important to use design materials that are so rich in content that it functions as boundary objects spanning the gap between different understandings and/or interests.

The workshops where arranged to promote active participation. The continuity in the process is here something that the setup has to handle carefully as it is important that the participants feels that the design work is going forward, and that the explorations they have done previously is recognized in the following process.
One difficult part of a collaborative design process is when you open up the design process to involve more people it can be hard to create continuity in the engagement. It is therefore important to be familiar with the mechanisms that can support commitment and team building.

The "experimental Office" project shows that it is possible to unite a group of diverse stakeholders on a concentrated common assignment and get a convincing, agreeable result out of it with the described design approach. We believe that the idea with the "Design Lab", the way the design process is organized around collaborative workshops with the use of design materials and the rules for participation are worth modeling in other projects. Compared to methods focusing on collecting knowledge and requirements a partner engaged design process seems to utilize the competences of the people involved to a greater extend.

The concrete result from the design approaches developed and used for the Experimental Office project, is a completed concept proposal of an actual office layout with integrates information technology solutions. A selected executive group among the participating companies will further rework the concept to a final realizable solution.

**Acknowledgement**

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Paper Three: Design Lab
Re-thinking what to design and how to design

Over the last decades there has been a dramatic change in the design agenda within the field of IT design. With the increase of mobile and wireless devices and the massive expansion of Internet availability the classical object of design – the dedicated information system targeted towards a well-defined user group – is about to vanish. Even if we conceive the setting where information technology is used as a 'system', this system can hardly be seen as the outcome of a systems design process. Arguably, IT design is today guided by new design agendas. Ubiquitous computing (Weiser, 1991) and from the user side information ecologies seem to be more appropriate labels for the emerging technology. The object of design has correspondingly been changing from systems to devices, tools or information appliances (Norman, 1998). This radical opening of the question of what to design has led to an apparent confusion on how to design. As the field of information systems is about to mature with a broad and widely accepted repertoire of design approaches and methods, ranging from workflow analysis to user involvement, this battery of approaches is loosing ground in favor of more techno-centric explorations, such as Tangible Computing. In our view there seems to be a growing divide between mainly North American contributions to IT design emphasizing new information technology concepts such as ubiquitous computing, tangible interaction (Fritzmaurize et al, 1995; Ishii, H. and B. Ullmer 1997) and augmented reality (Wellner et al, 1993), and mainly European contributions emphasizing the role of particular information technology applications in the light of in-depth studies of the potential contexts of use (Kuutti and Arvonen, 1992; Tellioglu and Wagner 2001).
Broadly speaking we see a possible merging of these top-down and bottom-up approaches to design of information technology envisioned and realized in the Computer Supported Cooperative Work (CSCW) community. However, as a marriage-point this field seems to be splitting up and falling back into more conventional schemes of technology-oriented concept development and practice-oriented design. Behind this unintended divorce of previously converging approaches we see two largely overlooked and partly related mechanisms at work. First of all we believe that the field of IT design is on both sides still held captive by the early framing of systems design as deductive problem solving. Since Simon and others formulated the broad notion of design (Simon, 1981; Jones, 1970), it has become axiomatic for the new design professions to see the design of new artifacts as a straightforward translation and reduction of intended, specified outcomes. Secondly and partly as a result of the first problem, the field of IT design has by large been unable to reach out to and integrate with other design fields such as architecture, industrial design and engineering. The reason is that the notion of information systems in itself maintains the sharp border between the material and immaterial and the "object world" (Bucciarelli, 1994) of information systems is, or has been up until recently, only about information - its generation, transmission and storage - in its own right. We regard this as a problem as for instance ubiquitous computing and information ecologies have obvious connections to for example architecture and product design.

In our view, a way out of this dilemma is to adhere to the notion of interaction design and to develop approaches to this new design field that transcends the fusion of conventional designer and information systems disciplines. What is needed is on the one hand the innovative perspective of interaction design, as contrast to the deductive problem-solving stance of the information systems tradition, and on the other hand to develop what we, borrowing from Schön, will call a conversational design practice (Schön, 1983). The material for this new interaction designer is not information or digital media, but interaction technology and how it blends in with our everyday lives. This includes embodiment into
existing contexts and materials, as well as interaction that can easily integrate with bodily behaviors and symbolic connotations. The elementary processes of designing interaction are not a Simon-like general model of deductive problem solving running from defining a problem, searching solutions and selecting the optimal. Rather the micro processes of design resemble the Schön’ian notion of designing as a revolving cycle of seeing, moving and seeing. The crucial point in developing this new interaction design practice is not only to make room for but also to actually install ‘conversations’ with the context of use as well as with the conceptual models guiding the technology envisioned. To accomplish this it is equally important to establish new formats of design representation, to expose and explore new approximations to how designing comes about and to probe for and reflect upon how designed artifacts eventually becomes meaningful assets in everyday life.

In this paper we describe a new design approach that we call the ‘Design Lab’ that explores what to design and how to design in parallel within the fields of ubiquitous computing, embodied interaction and augmentation. The approach suggests a ‘conversational’ design practice involving both industrial partners and potential users. In the Space Studio this design approach has been gradually developed in various design projects organized around a series of design events (For further development of this notion see Brandt, 2001) based on participatory inquiry and collaborative design. It is based on the experience that the design process is highly decisive for the object to be designed. The Design Lab represents a way to open the design process for more people than is engaged in the traditional design team. The essence and challenges consist in the creation of a reflective and constructive dialogue between designers and stakeholders with different competences and interests in the object to be designed. All design events are oriented towards two main issues: inquiring into “what-is” and exploring “what-could-be”. However, this does not imply a sequential process, where focus shifts from inquiry to design as soon as sufficient amount of information from the design situation is collected. In fact, arguably there is never any sharp distinction
between inquiry and design. Rather, at any point in time the Design Lab activities may generate input to the design process in terms of new insights from the life world of users; as well as in terms of ideas about future possibilities, identification of crucial aspects of use experience, etc. The design process is iterative and event driven, each event feeds into the next. In the following we will present experiences from projects starting with a focus on “what to design” and continuing with “how to design”.

The Dynabook project explored and designed concepts for use differentiated electronic books. The potential users ranged from children including teenagers to adults. The project was carried out together with a large Swedish telecommunication company, with their main focus being the relation between (digital) services and (physical) terminals. They did not have the competences to carry out an investigation by themselves, yet this was not just a task to simply hand over to an external design firm, but had to take place in close collaboration with people from their own organization. Therefore, the Space Studio was invited to organize the project as a Design Lab. In relation to the question of what to design we were inspired by Norman’s idea of designing appliances for specific uses (Norman, 1998).

Collaboratively, we investigated what kind of services the users wanted, what the terminals should look like, and various forms of interaction (Details on the project can be found in Brandt, 2000). Services, form and ergonomic factors were discussed from the point of view of such different situations as ‘while cooking’, ‘while repairing the car’, ‘while in bed’, while on a bus’, ‘while at school’ or ‘while on a beach’ (Brandt and Grunnet, 2000). Several design parameters were explored. For instance we investigated if the Dynabook should be personal or a device for several users, if it should be text or multimedia based, a stand-alone device or part of a set of devices.

In relation to what to design the Dynabook project highlighted an important problem. While the aim was to produce design concepts for electronic books with limited purposes, a single-purpose device,
the potential users seemed to favor designs where the artifact in use could be seen as a ‘prop’ in the staging of an un-prescribed enactment of purposeful action (For a more elaborated discussion on this see Binder 2002). In this case the designing of appliances seem to suffer from the same problems of over determination, as did the designing of tools. The book metaphor in itself was evocative for the group of potential users, but when more detailed electronic book concepts were described, it became apparent that the users were reluctant to accept a connected display device, which did not allow them to set up their own connections for pursuing related purposes (Brandt, 2000).

Trying to meet the challenges of a new design agenda our goal was then to design for open-ended use, where the role of artifacts in a particular situation was controlled by the user. In the project “Beyond the control room” – we looked for alternative approaches to process control work in a wastewater treatment plant (Nilsson et al, 2000). The centralized control room has for long been a guiding image for process control work, however mobile IT opens up for new ways of working. In fact, centralized control draws a sharp line between a physical world with the machine components at the process operator’s hands, and a digital world with digital representations of the same components on a computer screen in the ‘control room’. While addressing this duality between the material and the digital, we tried to dissolve the border between machinery and screen icons by designing mobile devices for process control. In the study of operators’ work practice our conclusion was that the centralized system in use was far too rigid. A process control plant is characterized by never being in a normal state. There are always issues to deal with, coming from malfunctioning equipment or abnormalities in processed material, as well as from expanding or rebuilding parts of the plant. Based on the framing of a perceived problem, a core need for the process operators was to be able to select a set of components related to the problem for close monitoring or what we termed a “temporary focus”. We developed a concept called the “Pucketizer”, a handheld device that allowed operators to configure temporary foci for control “on the move”. Even though the operators may be seen as users of the
technology, the notions of use and users is somewhat misleading. With the design concepts, we collaboratively imagined instances of use. However, these “stories of use” served as examples of an emerging new practice where operators configured their own systems of monitoring. Instead of a fixed set of functions the concepts suggested a new set of system building components which left the actual setting up of usable system configurations to the future users.

So we did not design systems or applications in terms of directly matching our design to the activity system of the operators. Neither did we make tools or appliances. The notions of tools and appliances imply a fit to particular tasks or purposes that in our view very easily direct us as designers towards what Floyd calls “over-designed” artifacts (Floyd, 2002). For example, remote controls for specific plant components, such as pumps or engines could be seen as such tools. With the design of the Pucketizer we rather suggested a concept for temporary system building that enables the operator to assemble a (potentially general) input and monitoring device, such as a wireless display, with a particular set of plant components, such as a pump and a flow meter. This temporary assembled configuration, the Pucketizer, eventually became a tool for the operator, even if it is better described as a configuration device.

In general the strength or quality of a concept for open-ended use depends on its ability to support use in different contexts. For instance, the Pucketizer as a general configuration device arguably can fit into a number of different environments and activities with mobile users. The critical issue is that the artifact evokes significant and distinct meaning for the users in each new context the artifact is brought into. A functionality that is too general would become superficial, or too open-ended. If the Pucketizer’s main function was to support the exchange of information solely with objects in its vicinity - as a general probing and controlling device – it would not take on significant meaning in other contexts. Consequently, the creation of temporary foci in general was the main transcending quality of the Pucketizer design concept.
The Dynabook project focused primarily on the contexts of use outside work where the Pucketizer project was based on the investigation of a specific work environment. Still common for both projects was that the people involved wanted the designed object to be open to various use possibilities. In parallel with the present increase of technology density follows an increase of mobility and continuity in IT use. In ubiquitous computing, the mobile IT user is constantly moving through different contexts of use, social as well as technological, and at any point in time and space, a new information and communication service may be provided. This increase in dynamics of use, where each artifact can take on different roles, makes it difficult for the designer to predict use situations. In relation to what to design we therefore suggest a more open-ended view of the functions of future IT artifacts. In the traditional application perspective, the possibilities of use for an artifact are restricted to the activities designed for. From what we can see, the technical components in the ubiquitous computing era will still have a limited set of functions. However, it is crucial that these functions are regarded as possibilities that can be configured by the user depending on his or her current situation and the activity engaged in. This may be described as a deliberately “under-designing” new IT artefacts to provide room for the user to independently configure devices for the situation at hand.

The Design Lab is about collaboration. It is of importance to find ways of involving people in the design work that engage them with one another and the design task with open agendas and a willingness to put their stakes at risk. On a practical level organizing collaborative design is not commonplace. The participant’s life-worlds have to be taken into consideration. It is necessary to find ways of both bridging the gap between various language-games (Wittgenstein in Ehn; 1988), expertise and interests, and finding out what to explore and how to create possible futures in common. In general the Design Lab events share two main features: (1) a working process focused around three aspects of designing – staging, evoking and enacting; and (2) the collaborative creation of design artifacts. By staging we refer to
the setting up and the framing of a design project. In this we conduct inquiries into the context in which the object of design is to be used, and we create design material that can be used for further exploration. In our view the best way to do this is to organize various activities for participatory inquiry into existing practice together with potential users (Johansson, 2005). These activities mainly use data from field studies using e.g. video ethnography and cultural probing. Examples of Design Lab events include; inquiry into video-snippets about users everyday life-worlds; commission to play a design game guided by a set of rules (Brandt and Messeter, 2004); design suggestions or collaborative development of design ideas, design concepts, scenarios, or various design models. The collaborative activities and materials can be prepared by any of the participating stakeholders. Essential is that the participants can relate to the design materials, that they are used to engage the participants, and that they evoke reflective conversations with the other participants. Acting out a future scenario completes one design cycle. Here a story of use in practice is performed. This enactment is tightly grounded in the participant’s dialogue and puts the design and arrangement of space, scenery and props, the staging, into play. Enacted scenarios stimulate internal reflection and external feedback, which gives material for the continuous design cycle to move on.

In the Experimental Office project the aim was to design concepts for a future office environment, integrating issues within architecture, technology, furniture and work practice. The Design Lab involved four industrial partners, and a group of potential users with experience from project-based work. The companies were an information technology company, a company producing office furniture, a telecommunication company, and a real estate company. The project was based on a vision of creating a working laboratory – an experimental office in common. The partners agreed upon the premise that the object to be designed was to be a context for exploration by people actually working in the new environment. They did not want a showroom or a demo-lab for each of their latest services and products. The Space studio was involved and made responsible of organizing and facilitating the
design work (For more details about this project see Fröst, 2002, Johansson et al, 2002; Fröst, 2004).

For the four Design Lab events a series of design games were developed. Each design game focused on different aspects of the design task. This was a way of organizing the design events and making room for the various competences and interests of the people involved. The first game was ‘The landscape’, which focused on staging the design by exploring the relations between things, people’s activities and places. The goal was to build a landscape that the participants could agree upon. They choose between three game boards with generic shapes as staging area. The game pieces, or to use the theatre metaphor the ‘set-pieces’ for the staging, was plastic cards with images from videos. Each player was given a number of ‘set-pieces’ and by taking turns they looked at the video snippets (Ethnographic video snippets from field studies of office workers at different companies.), discussed what they saw on the video and placed the set-pieces on the game board. Soon a discussion started about what the generic shapes on the game boards should illustrate, and how the set-pieces related to one another, the game board, and to activities taking place in the office. As time passed the meaning of the staging of the design developed through negotiations. The set-pieces were constantly moved around on the game board to make room for new things, and the moving of set-pieces evoked new discussions. The staging that the groups made on the game board had social, physical and technological properties, which highlighted important preconditions for the envisioned future office. The landscape game engaged the players and it was easy to understand and play independent of the participant’s competences and interests.

As the landscapes were built in common the set-pieces used became more than mere representations of the video snippets. More importantly they became placeholders of the discussions the set-pieces and the videos evoked, and their placing on the gameboard. For example one group discussed a (computer) server room. One of the participants picked up a set-piece and after everyone had looked at the video snippet he suggested that a server room
was not necessary in the future in this work environment. It started a discussion about the work environments represented by the video snippets, the participant’s own experiences, and how one of the participating companies planned to provide various software and network services to other companies in the future. After a while, they concluded that a server room was not required in the Experimental Office environment. As a refinement a participant suggested that they should create an off-side corner on the game board for “things that do not belong here”. Another person elaborated on the idea by suggesting two off-side corners; one for the set-pieces that were irrelevant for future office work and one for set-pieces that were necessary services but which the future office environment did not need to have in-house.

The Contextualizing mobile IT (COMIT) project concerned mobility and situated use of multiple devices (Messeter et al, 2004). We investigated how to design for accommodation and coordination of several devices and services across different social spaces – in work as well as leisure. The main objective was to develop future use scenarios and associated IT concepts using the Design Lab approach. The COMIT project involved four industrial partners. One partner worked with mobile services and terminals, one was a telecommunication company, and another company developed digital pen technology and the last developed handwriting recognition software. In addition, three potential mobile IT users participated in all the collaborative design events.

Near the end of the project potential users created enacted video-scenarios in their own environment. In preparing the scenarios they produced prototypical forms of various mobile devices, which they used as props for enacting the scenario. One of the potential users was a fashion designer with her own shop. In one of the scenarios she shows her new garments to a costumer company representative, who takes on the role as customer. Together they browse through the collection while the shop owner comments the different garments and answers questions from the customer. After a while, when some garments have been chosen, the customer want some corrections to be made on the garments she wants to
buy. Pictures are taken of the clothes using the ‘image device’ prop. Then the pictures are annotated with comments on requested changes, prices, colors, etc. using her ‘image editing tablet’ prop. The annotated pictures are sent from the ‘image editing tablet’ to a portable printer. The scenario ends when the pages are printed and the personalized catalogue is handed over to the customer.

The COMIT project in general pinpointed that while mobile devices have opened new possibilities of IT use in space and time, the important design challenge was to support the user in handling multiple roles and social spaces, given the contextual factors of the situation. The partners agreed that the scenarios and ideas developed using the Design Lab approach provided fruitful examples of how these challenges can be met (Messeter et al, 2004).

The enacted video scenarios can be seen as concrete design proposals. In the example above, potential users created scenarios in their own work environments that later became the material and basis for a participatory inquiry and collaborative design session in the Design Lab. While enacting the scenario the users were immersed in the situation and used the foam props as if they were actually functioning. By acting out a scenario, the people involved sense the use situation and get a bodily understanding (Brandt and Grunnet, 2000) of how the objects to be designed could work. At the following design event the video scenarios were showed on a monitor and hereby explored more from a distance. Thus organizing the activities in the Design Lab as a reflective and constructive dialogue makes new ideas and rearrangements emerge, driving the design task in a pendulum between reflective distance and being immersed in the enactment. A central issue in the Design Lab is the continuous creation of various design artifacts as they shape both the design process and its outcome; both what to design and how to design. The production of design artifacts, seen as a reification of the design ideas produced, supports the participatory design conversation by providing material for negotiating interpretations and meaning (Binder, 1996; Brandt, 2004). In a collaborative setting the design artifacts
produced have to function as boundary objects (Star, 1989) in the sense that they give meaning to different participants even though they have different professional practices, professional languages and interest. Hence the artifacts have to have a richness so they can be interpreted in different ways but still having a common core accepted by everyone.

In conclusion, the Design Lab approach involves designing the process and designing the object simultaneously. The approach abandons the framing of IT design as deductive problem solving. Instead the design process is framed around a series of collaborative design events based on participatory inquiry and collaborative design. Thus central in the Design Lab approach is the conversational design praxis where social, spatial, physical and digital aspects are included. The scope is widened to include not only the design of an object but also to include designing the social and physical spaces for action and the implications for the users.

Concerning what to design, paradigms such as ubiquitous computing, tangible interaction and augmented reality has made it more apparent than before that designing concerns more than the objects as such. The projects have shown that mobile IT user moves between various contexts of use, technological as well as social, which makes it very difficult for the designer to predict use situations. The IT users do not want single-purpose devices for one specific context. In this sense future IT-artifacts should not be based on the notions of tools and appliances designed to fit particular tasks or purposes. Instead it is important to design devices that can be used in various contexts, and are designed in such a way that they give the users the freedom to configure the device for different situations. It seems better to deliberately under-design artifacts and hereby create conditions for open-ended uses.

With regard to how to design, it is important to note that the Design Lab is a design approach, not a method. For each design project the design process needs to be designed. The Design Lab requires an open dialogue that makes sense to all participants. The
The conversational design practice that the Design Lab embodies is best driven by events, e.g. workshops or other types of design session, where engaging all stakeholders in the process. An important aspect of these design sessions is to set up activities that support movements between being partly immersed in use situations and actively creating distance to them to be able to explore future possibilities. To include various aspects of designing in the Design Lab, we have found it useful to work with the notions ‘staging, evoking and enacting’. Staging focuses on the framing of the design situation based on exploration of existing practice, evoking is about internalizing inquiries about the present and from this create ideas about possible futures, and enacting involves acting out scenarios to put oneself in possible future use situations. Within the Design Lab staging, evoking and enacting are used to frame the exploration of existing practices as well as new design possibilities. These notions are interconnected and exploring one informs another in an iterative process involving a series of events. In this exploration we have found the use of different kinds of design artifacts to be of importance, ethnographic video-snippets represented as cards being one example of many. These design artifacts function as boundary objects and help bridging the gap between the life-worlds, experiences etc of different stakeholders. It is important that the artifacts are ‘rich’ enough to accommodate different interpretations, and at the same time they contain a core that can be recognized and accepted by the group as a whole.

The Design Lab as an approach has proven useful in various design domains, ranging from IT-devices for process operators, over mobile technology for families, to multiple perspective design of future offices. In the projects carried out the Design Lab has successfully embraced the fields of IT design, Design engineering, Architecture and Industrial design. There are many aspects of the Design Lab approach that lend themselves to further exploration and development, but our experiences so far indicate that our approach is fruitful in addressing the current needs for a new design agenda, both regarding what to design and how to design.
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Abstract
During the last few years Personas has become an established design technique within the IT-design field. The Personas have proven itself as a valuable approach for designers to switch from a developer’s perspective to a user’s perspective in the design process. The technique is claimed to help designers in keeping a clear focus and shaping a consistent user-interface by making “the user” present in the design work. In this paper we report on a number of projects where we have elaborated on the Persona approach for collaborative design. With the goal of creating “user presence” in the design process, we have developed an approach building on a combination of ethnographic field studies, participatory inquiry, and collaborative design. This paper carries two interrelated points: the grounding of personas in existing practice; and the notion that “the user” is created as an ongoing process throughout the design work.

Keywords

Introduction
For a number of years we have been working with different ways of involving “the user” in the design process. Taking a starting point in ethnographic field studies we have developed a user-centered design approach that uses established techniques, such as Personas, to explore existing practices and with them as a starting point generate future visions. Coming from environments representing the Scandinavian design tradition (Ehn, 1988) our multidisciplinary research group have been involving “real” users
in every project we have worked in. We have found that “the user” needs to be made present also in the design material. Whilst the persona approach often is used to replace the “real” user, we have kept on involving real users and the personas have been a boundary objects among other design materials that everyone taking part in the design process can make use of.

Background
Often users are talked about as being “represented” in the design process. In this paper we will make an argument for “present-ing the user” - making the user present in the design process. The problem of representations has been debated extensively within the community of “ethnography and design” (for an overview of this topic, see Plowman et al 1995). The standpoint put forward in this paper reflects the notion expressed in René Magritte’s painting “C’est n’est pas une pipe” [This is not a pipe], 1928, [County Museum of Art, Los Angeles]. The painting is obviously not a pipe, but it is still a beautiful painting. The same goes for representations of “the user”, they are not (and should not be treated as) users. Instead they should be considered as means for changing perspectives during a design project.

Design worlds and user worlds
Several studies of the design process argue that designers construct their individual perspectives of the design situation at hand. Bucciarelli (1994) introduces the concept of object worlds to describe the set of elements in a design situation that the individual designer relates to in order to frame the design problem. It is necessary for each designer involved in the process to construct her object world for the design situation in order to apply her specialist skills. This is in line with Donald Schön’s notion of design worlds (Schön, 1983). According to Schön, design worlds are constituted through design typification, where the application of design rules depend on familiarity with the types of elements perceived as present in the design situation. Sharock and Anderson (1994) describe how software developers make “the user” present as a “scenic feature” - a tool for the developer to change from a developer’s perspective to a perspective of use. Referring to
Schön, and his notion of design world construction, they argue that the user is introduced to design through the use of typificatory structures. They point out that this simplistic way of bringing in a user perspective seems to work fine for the purpose of the designer. "Seen from within the activity of design, in the midst of exploring the design space, these structures enable designers to construct their design worlds" (Sharock and Anderson, 1994 p.18) According to Sharock and Anderson (1994) the developers did not gain any new knowledge about “the user’s” everyday practice, something that might have been good, but they were able to explore what they did know and could establish a scenario of future use. In our view, this notion of a “user world” being constructed through negotiation between a set of heterogeneous orientations brought in by different participants in the design process, seems to be a relevant perspective on how “the user” is made present in the design process.

Our understanding of design and “present-ing the user” in the process, takes as one starting point a constructivist perspective on understanding the design situation, in line with Schön (1983) and Bucciarelli (1994). Another starting point is to account for the ill-structured and dynamic nature of design problems as described by e.g. Rittel and Webber (1974) and Herbert Simon (1984). In their seminal paper, Rittel and Webber argues that numerous cases of failure in problem solving on societal level (e.g. town planning) has made it clear that there is a class of problems where no rational methods apply. They describe ten properties of such ill-structured – or “wicked” – problems, of which two properties are particularly relevant for this discussion: the lack of a definitive description of the problem and the fact that there is no logical solution to a wicked problem (the problem depends on the solution so and the space of possible solutions is basically unlimited). The information needed to understand the problem is dependent upon the current construction of the design world. Each question that we put forward in search of more information is dependent of our understanding of the problem, and its possible solutions, at the point in time when the questions is formulated. In order to predict the necessary information needed all possible solutions must be
known – an impossible task. Therefore, the formulation of a wicked problem is the problem.

Also, according to Rittel and Webber (1974), the process of problem solving and problem understanding are the same. Since there are no criteria for deciding when enough information has been collected, the problem solving process does not terminate for reasons inherent in the logic of the problem, but simply when we run out or resources. This applies to seeing “the user” as an integral aspect of the design process. Therefore, in our view, any description of “the user world” is inherently open for negotiation, just as any other aspect of the design situation. Constructing “the user” is an on-going part of the design process, and personas must be regarded as open-ended descriptions of “the user” that are constantly re-negotiated throughout the design process as further knowledge of the design situation is developed.

**Personas**

“The inmates are running the asylum” by Alan Cooper has been a barrier breaker, making the ‘Persona for design’ known to industry (Cooper, 1999). Within the academic community several authors have presented their use of personas in a user-centered design process. Grudin and Pruitt (2002) highlight the benefits of gaining insight in social and political aspects through personas. Real users are complex, and inconsistent in their wishes, whereas Personas are well defined and clear, and therefore better suited as a starting point for design work.

The academic discussion about Personas has to a large degree been about how engaging the personas are. Djajadiningrat et al (2000) argues for “extreme characters” where personas “try to expose those emotions and character traits which remain hidden in scenarios for supposedly real-life characters because they are incorrect or embarrassing” (Djajadiningrat et al, 2000 p.71). In the same vein Nielsen (2002) argues that personas, as described by Cooper (1999), are too “flat” to engage designers. With examples from movie manuscripts she suggests the development of characters with richer personalities and better descriptions.
Our approach

The projects presented in this paper all have in common that they strive to go beyond desktop computing. The focus has been on designing for ubiquitous computing environments where users are not immersed by technology. Rather they are allowed to experience technology alongside other elements in the environment. This brings forward new aspects to be considered in the design process, which in turn led us to develop new approaches to making “the users” present. The perspective presented here, using personas for “present-ing the user” to gain a personalized image to work with, is relevant from a descriptive ethnographic perspective as well as from a collaborative design perspective.

Our understanding of design is very much a continuation of Donald Schön’s writings (1983). The designers need to go in dialogue with the design situation. Designing for user-experiences is difficult since the experiences do not yet exist. The design situation is therefore only partly known, which means that we have to invent (envision) how it possibly can be (different from today). We have experienced that the envisioning work benefits from being organized collaboratively mixing competences and experiences. The collaboration gives a larger base for creating possible futures. We usually organize a collaborative design workshop, or series of workshops, with many stakeholders. A challenge in collaborative design is to organize the work so that it becomes meaningful to all participants. One of the starting points for the design work is what we term Design Material. Design Material can function as boundary objects for design groups (place holders for design ideas, opinions, and discussions; see (Star, 1989) for an elaborated description) as well as making knowledge about the design situation present. The design material can be ethnographic material, probing material, or mock-ups. The different kinds of design material we have been using all have in common that they are grounded in existing practices and based on engagement with the domain we are designing for. This is not typical when working with personas. Within the CSCW-tradition the question of how to let ethnography inform design has been an ongoing debate during
the last two decades. The research presented in this area has with few exceptions been about providing descriptions of how work is done. For example Crabtree (2001) uses his ethnographic descriptions to inform design and see “what action should be taken in light of them” (Crabtree, 2001 p.218). He is assuming an ongoing design process that is ‘interrupted’ with things to consider.

In contrast to both CSCW-projects and persona-use we put emphasis on the participatory inquiry and the exploration that design work requires. When we are working with future scenarios we need to inhabit the world we are designing for, which is where “the user” needs to be present. Like Cooper (1999) we strive for believable characters, but we also want them to be well grounded in existing practices. In the design sessions we typically start out with looking at video snippets selected from an ethnographic field study, and we immediately start building our future scenarios from the snippets we see. The short video snippets are used as building blocks for future visions. We prefer to work in mixed design groups with people from industry, researchers and “the users” working collaboratively to envision what can be desirable possible futures (Johansson, 2003). This connects back to the discussion of representations. In the design sessions described here the problem is not how true the inhabitants are, but their usefulness.

“Models are then seen as interpretations, as constructions, which for some purposes, under certain conditions, used by certain people, in certain situations may be found useful, not true or false.” Robinson & Bannon (1991)

“The present-ed users” are useful when they are generative, and the problem is to combine this with them being grounded in actual practices. “The present-ed users” we work with are examples of who the future “users” could be (now). “The present-ed users” have “real people” as their foundation, but in the process of selecting what building blocks to make available during the workshop “the present-ed users” get simplified in relation to “the real people”. Robinson and Bannon continue: “We thus see the modelling process as one of reframing rather than describing or abstracting.”
Reframing is a key word - when we let the design workshop participants participate in the construction of “the present-ed user” they reframe the design situation.

**Ethnographic descriptions**

The question of how ethnography best informs design has been discussed extensively during the last two decades (for an overview see Plowman et al 1995). As Crabtree (2001 p.218) notes: “The problem in this is that the instances – descriptions of work – do not “speak” to design”. Strong arguments for the role of ethnography in design, has been put forward. When different approaches meet, adjustments have to be done, to make them strive towards the same goal. Unfortunately, it seems that some ethnographers hold ethnography as sacred, and the designers have been unwilling to change their practice. Andy Crabtree (2001) is one of the voices that have been able to take the ethnography - design relation a step further. He uses himself as a mediator taking part in the design work. He tells stories from what he have seen in his study whenever he finds it relevant during the design process “What they [descriptions of work] mean to design – what action should be taken in light of them – has to be established by the ethnographer(s) and designer(s) together.” (Crabtree, 2001 p.218)

The approach presented here is perhaps more radical in the sense that it runs a more interweaved process, taking a starting point in ethnographic fragments when constructing design ideas. The idea with the fragments is that they invites to reflection. When one looks at Ethnographic video it is sometimes hard to think how things could be different, possibly due to the sequential character a video has. People (work practitioners) are excellent in making things look straight-forward also when they are doing workarounds. When one observes an experienced practitioner there is a flow in the work that makes it look simple and evident. Sitting in a design workshop watching long sequences of the material can be frustrating since it does not offer many openings for outsiders to see how it could be different.
In the workshops we have arranged, the participants have been invited to build the future, the restriction that they have is that their building blocks are gathered either from a field study or results of our (sometimes provocative) inquiry actions. To build with this kind of material means that you have to make your own meaning of each piece, and almost without exceptions you have to describe you interpretation to you fellow designers. This to be able to make you argument you have to think about the material.

Examples
In several projects we have been working with “present-ing the user” (Nilsson et al, 1999; Johansson et al 2002; Messeter et al 2004; Brandt and Messeter, 2004). Our entering point has not been to create personas, but to ground design in actual practices from a design point of view. In this section we will highlight two ideas of making the user present in the design process. The first idea is the Pixi-books, portraits of potential future users with a special twist. The second idea builds on a development of a design game where the aim of the game is to explore the user.

The material used in both approaches is based on selected fragments from field studies. The pixi-books are collections of still photos and statements made by the persons we followed. The portrait game is based on video snippets that are chosen to display everyday activities. The selection is in both cases made by us as researchers and inspired by Buur et al we have strived to find episodes that does not go “into personal matters, but simply sought to capture the landscape, the places, and the kind of awareness that seemed to be associated with being there” (Buur et al. 2000). We also tried to capture how the persons we followed felt about what they did. To create a material of this kind we have chosen to think about design during the field study and asked the persons we meet to describe what they are doing. This is a way to make the field material more easily accessible for designers. The pixi-books are good illustrations of this. Typically the statements are the process operators answers to questions like “what are you doing now?” “Some problems are to small to be detected by the system” (so they look into tubes and tanks).
**Pixi-books**

In a project dealing with automated process plants, we worked together with process workers to explore possibilities with mobile technology in process control. The industrial sites we ventured into were: a number of wastewater treatment plants; a sugar refinement plant; and a chemical plant producing paint products. In workshops with designers from technology producing companies we used our own version of Pixi-books to portray users. A pixi book is a children’s book with a very short story. We had prepared five pixi books, each containing a portrait of a process worker. The books are 8-10 pages long. On every page there is a picture and a short statement that the person being portrayed have said in relation to what is on the pictures. We created the pixi-books out of video material from a few short field studies. The statements are the kind that only appears 10 or 20 times during a day of field study.

![Figure 1. Four of the pages from one of the pixi-books.](image)

The idea with the pixi books is that they should portray “complex” users. At the same time as they provide enough to make sense of
the user, they do not include any data sheet with age, position etc. In a critic of the persona approach Nielsen (2002) has recently pointed out the risk of making characters that are “too flat”. Portraits need to be engaging, and evoke feelings and thoughts about the user. According to Nielsen an expression like “she smiles” is more evocative than “she feels happy” when describing a character. In producing the pixi books we tried to select crucial statements that were evocative and told a lot in one sentence. In some cases we rephrased the quotes to become more evocative. When using the pixi books we could observe that the workshop participants started to focus on how it would be to work in the plants.

-When we see them here, it is interesting to study. If it is atmosphere images, it is fun to see how he looks in that situation. Or is he comfortable in the others. Is he smiling? Is it good, is he focused, or can’t he stand it.

In trying to make sense of one pixi-book there is some uncertainty, but is has something to do with the atmosphere. Next the designer brings up the expressions they can identify, and raises the question of how the process worker feels about his occupation. In a previous workshop with process operators the theme “meetings on the plant” had emerged, and in this workshop the assignment was set up to look more into meetings. In the workshop the participants had several different kinds of design material to work with, where some focused on activities, others on places and the pixi-books focused on people. One of the participants looking in a pixi-book felt the resistance that the material gives. He stopped and reflected:

-I am sitting here thinking ...One can almost not... when one starts to investigate where people meet... Isn’t it possible to turn it around entirely? One walks a long way, another walks equally long to meet the first one. Maybe we should use a computer as well. But can’t this be done at a distance - can’t it be done from home? In addition we have these personal issues to consider. What do I find good/nice? And maybe it is the change of air that is good, I could
perhaps do something with a remote control from my chair. But getting out of the office and see some new things, feel another temperature and get some fresh air...stretching ones legs for a minute.

In this short statement a design principle is getting formulated. It is not what is possible with the technology that is the challenge but how to make the work enjoyable. The pixi books are portraits that are intended for designers to see the human side of practices. As an alternative to personas, the pixi books have the strength of letting the design groups make up their own minds of the person they are designing for by presenting contextualized statements and leaving the interpretation to the designer.

The portrait game
Through the course of a number of projects we have developed a number of design games as part of our approach to collaborative design. Using games in design is not new. Habraken and Gross (1987) developed a number of ‘concept design games’ that were used as a tool for research in design of built environments with the aim of improving the design communities working on buildings and urban environments. Games have also been used in concrete participatory design projects. As one of the pioneering examples in the Scandinavian vein of participatory design, Ehn and Sjögren (1991) describe how they supported participation in change processes in carpentry and newspaper production. While Habraken and Gross (1987) have used design games as a means for learning about design as a social activity, we use games in real-life projects as a means of supporting collaborative design work. In early participatory design projects, like the one described by Ehn & Sjögren (1991), the focus has been the empowerment of workers. Today, in many cases IT product development involves several stakeholders apart from users. Our focus is therefore broader. The overall aim of the design games is to help facilitate a user-centered design process for cross-disciplinary design groups early in the design process. Framing collaborative design activities in a game format, arguably improves idea generation and communication between stakeholders. By shifting focus to the game, power
relations and other factors that might hamper idea generation, are downplayed.

Here we present one of the games developed, the portrait game, as part of our approach to an active and dynamic construction of the user in collaborative design. For a description of the complete set of games, see Brandt and Messeter (2004). The intention of the portrait game is to help the stakeholders involved develop, negotiate and express a shared image of the intended users grounded in field data. During the course of the game the image develops through the collaborative creation of a web of interrelated stories about the user. The material in the portrait game is based on video material from ethnographically inspired field studies.

Figure 2. Four ‘Moment-cards’ (top) and ‘Sign-cards’ (below).
The game material consists of two types of game pieces called ‘Moment-cards’ and ‘Sign-cards’ (see figure 2). The Moment-cards are numbered plastic cards linked to a short video snippet of 30 seconds to two minutes from video material gathered during a study. Our work with these kinds of cards is inspired by the “Video Card Games” developed and described by Buur and Søndergaard (Buur and Søndergaard, 2000). We avoid putting names or labels on the clips, as we believe this could spur associations forcing specific interpretations on to the game. We have put some effort into making the video clips easily accessible for the players of the game. We have used RFID-tags to associate each card with a digitized video sequence, and by holding the card next to a RFID-tag reader the corresponding video can be played (Sokoler et al 2002). The number of Moment-cards should be small enough to be manageable but large enough not to be constraining. In our projects we have normally used between 20 and 40 cards.

The Sign-cards are used to label the stories created. We have provided a general set of 30 Sign-cards, each with a word printed. Examples of words in the general set include for example: ‘despair’, ‘pace’, ‘vibrant’, ‘closeness’, and ‘zones’. However, the purpose of the Sign-cards is to provide a conceptual framework for the stories. Therefore, depending on the project, different sets of concepts or words can be entered into the game as Sign-cards. For example, in one project the client introduced a set of keywords for future trends they were interested in, which was transformed to Sign-cards.
Figure 3. In ‘the portrait game’ participants create a shared image of a user.

The portrait game is best played with the players gathered around a flat surface as ‘game board’, e.g. a table. The Moment-cards are either ‘dealt’ to the players as an ordinary deck of cards, or simply spread out on the surface. In the first case, the player to start the game receives five extra cards. They can chose to either watch all the videos first to get an impression of the field material or they can begin to make game moves and watch the videos as they go along. The first player constructs a story using at least five cards of the ones available. When the first player has decided on a story, the corresponding cards are laid out horizontally on the game board and the story is presented. The next player chooses two to four Moment-cards that make up a second story and one Sign-card as label for the story. The new story is added to the first one by placing the sequence of cards on the game board so that it crosses the first one. The card at the intersection must be part of the story. This way each subsequent story will share one card with the previous story, and gradually a crossword-like structure will emerge on the game board (see figure 3). Several rounds are played until the participants agree that new stories do not add new information, and the image of the user created is ‘saturated’. At this point, the players summarize the image they created of the user as a short story in text or as a list of keywords. The image of the user can then be used in scenario creation later in the design process.
Playing with different stories about a user by combining sequences of video cards helps participants creating a shared image of the user. Furthermore, the story creation encourages participants to probe deeper into the user world, finding new issues to address in design. The game pieces, or props, allow stakeholders to become more fluent in the language of expressing design moves. The activities somewhat resemble the sketching of architects. Having objects at hand to play with is important as it speeds up the process and help participants to focus. As design material game pieces and props create a common ground that everybody can relate to and at the same time they act as ‘things-to-think-with’ (Papert, 1980, Kafai and Resnick, 1996). They function both as a way of keeping reference to the practice in the design work and as boundary objects (Star, 1989) allowing different participants to read and interpret the material differently. A crucial property of game pieces is that they are rich enough in content to span the gap between different understandings and/or interests of different stakeholders.

We decided early to work with the notion of design games as a means of structuring concept design activities. Using the design game format provides a structure for creating portraits, it is an internalization process where ‘who the user is’ needs to be explored, viewpoints needs to be negotiated and the players will experience what makes the user who s/he is. The gaming format supports temporary shift in focus on different aspects of designing. Earlier studies in creativity (Finke et al, 1992) have showed that heavy restrictions on idea generation activities actually can improve the outcome. In our trial sessions the rules of the design games seem to play such a positive role of restriction. For instance, in the portrait game producing a story with the restrictions of using the video cards at hand that fit into the current “crossword” of the game seem to be an easier task for the player than openly generating use stories firmly grounded in ethnographic field data with the main goal of producing good design. By entering into the game the participants also agree to play by the rules of the game, if rules are to be changed this has to be negotiated. Arguably, this
plays down external factors like power relations between participants or conflicts in organizations. According to Burns et al (Burns et al, 1997) games may smooth collaboration in design by making it more independent on credentials: “in this context, members of the design team are removed from their common views and might contribute less self-consciously” (ibid. p. 1). Thus, structuring design activities around games is one important driving force in the process of constructing the user.

**Discussion - A continuous re-construction**

These examples from workshops that we have arranged illustrate a number of issues relating to the construction of users. In the first design game, we had constructed “the users” and each pixi-book was about one “real” process worker. In the second game we let the workshop participants construct “the users” with ‘set pieces’, building with fragments from different “real” people. Finally in the third game we created the user and the concept simultaneously. We used both short video snippets and the material we got back from our probing. In this game we engaged “the real people” and they were confronted with how others had created “the user” from the material about them. They could see how the concepts developed for “the user” appealed to the “real” person.

The process that is argued for in this paper can be described as a process for continuous re-construction. The design leap from existing practices to new ones is seen as an ongoing process. The “playing around with the truth” (quote borrowed from Gaver et al, 1999) is made possible because it is understood that the scenario being created is fictive. The question “what if?” can be imposed on “what is”. The scenario can be seen as a “lab” where it is possible to experiment with “what is”. A point stressed both by Cooper (1999) and, Grudin and Pruitt (2002) is the knowledge of the personas. Cooper personas “are so important that we cram them down everyone’s throat.” (1999, p.138). Grudin and Pruitt have “created many variations of posters, flyers, handouts and giveaways (e.g., squeeze toys- with persona images and information)” (2002 p.148) to communicate the personas to the design team. These approaches seem to be fixating the personas, not leaving much room for the
exploration of who the personas can be in different contexts. Design and exploration are closely connected. To design one have to understand, and to understand a practice one have to be able to see how it could be different (design). What the personas can offer is to let “the user” become an entity of its own right in design worlds.

**Conclusion**

When we wanted to design ubiquitous computing environments a need for new ways of establish a relation to “the user” became apparent. We had good experiences with the use of ethnographic field material in collaborative design sessions, and wanted to continue on that track. We were convinced that the grounding in existing practices is essential, but we also recognized a need for “playing around with the truth” in order to create something different from ‘what is’.

From a design point of view, the use of Personas as described by Cooper (1999) and Grudin and Pruitt (2002) introduce the same problem as when work descriptions are used to let ethnography inform design. The descriptions (of work, or personas) are not engaging for the design team. A persona is not something that can be placed on the desk where the designers work to make it present in the design work. The design work includes inquiries and it seems reasonable to let this be the driving force. Making “the user” present in the object/design world of designers requires that “the user” has something to offer as input to the design process - may it be “data”, “inspiration” or “creative resistance”. Instead of treating fieldwork as a separate activity feeding the design process it becomes an integrated part of concept development. We have created a set of materials that allow us to continue to explore “the user”. Instead of freezing the persona, we continue to broaden and enrich our understanding of the user through design moves where early concepts, ideas and mock-ups work as probes. To work with fragments as building blocks to construct “the user” has several advantages. The characters are believable since they are built with material from an ethnographic study. While some researchers have experienced problems with designers’ engagement in Personas we
have only seen examples of the opposite with this approach. Our experience tells us that as the framing of the user evolves, a platform emerges where a number of concepts and ideas can be generated. In our future work we will continue to explore and develop techniques for “present-ing the user”.

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To design is to envision possible futures. It is a concrete production process in which this envisioning is embodied in artefacts, with the ability of conveying meaning to others. In the process of designing, to imagine use and users is integral, but very often the imagery available to the designer is limited to professional stereotypes or to personal experiences, turning the designer’s twin image into the image of the user. In this case, ‘the user’ becomes a tacit reference that seldom surfaces directly, but guides the designer’s intuitive evaluations of the design. In a study of a software project, Sharock and Anderson find that even mainstream developers makes “the user” present as a “scenic feature” (Sharock and Anderson, 1994) The user becomes a tool for the developers for the changing from a developer perspective to a perspective of usage. Sharock and Anderson argue that the user is introduced to design through the use of typificatory structures, pointing out that this simplistic way of bringing in a user perspective seems to work fine for the purposes of the designers. “Seen from within the activity of design, in the midst of exploring the design space, these structures enable designers to construct their design worlds”. The developers did not gain any new knowledge about “the users” everyday practice, but they were able to explore what they did know and could establish scenarios of future use.

More recently it has become more customary to develop scenarios, user profiles or personas to explicitly account for perspectives on use. As design artifacts, a persona or a scenario can form part of the materials of the design situation, and can in this way invite to a co-design of use and artifact. However, often scenarios and personas are constructed with only limited reference to real people and real situations, and they tend to be black boxed as embodying an initial design brief. Furthermore, the explicit reference to users
and use run the risk of reducing the target audience to one-
dimensional figures fitting all too nicely to the envisioned design.

Rich in imagery, ethnographic studies of peoples’ everyday
interaction with the things around them, are highly valuable in a
design focusing on complex environments. To replace interviews
and questionnaires with ethnographic methods of participant
observation has shown to be an important move in the
understanding of everyday practices as constituted by situated
interactions. Accordingly, the collection of video and still images
has enriched the 'raw data' of the study. The accounts of
ethnographic observations are often contradictory to conventional
conceptions of how, for example, technology is used. However, the
'translations' of ethnographic material into materials of design is
often complicated by the fact that there is a split between user
studies and design. The 'ethnographer' may tune his accounts to
make them design relevant, and the 'designer' may adapt the
specification of the design to the kind of findings that the
ethnographer produces. But, as Andy Crabtree has shown in his
overview of approaches to ethnographically informed design
(Crabtree, 2001), the majority of attempts still allow only a shallow
passage of information from user studies to design. In our view, the
process of making sense of ethnographic data must become part of
the design process, and the prerogative of the ethnographer to
interpret the data must be substituted by a joint inquiry ensuring
compatibility of interpretations both towards existing practices and
towards the emerging conceptions of future use.

But why not include the people designed for in this inquiry? Design
is the envisioning of new practices, but it is also an inquiry into
what may change and what remains constant as new artifacts are
introduced. As participants in this inquiry, the people designed for
do not hold the answers, but as part of the design team they can
probe for new possibilities. The notion of probing is particularly
interesting here. Gaver and colleagues’ work on cultural probes
has quickly gained resonance in many design environments.
Nurturing a heritage from situationist art practices, they have
developed probing strategies, where the designer crafts exploratory
probes. The probes are not prototypes or design drafts, but rather, as thought-provoking experimental devices, attempts to map the terrain for design (Gaver et al, 1999).

Without necessarily going as far as Gaver et al, probing provides a design strategy, which can refurbish user-centered design. Ethnographically informed studies of existing practices provide an evocative material when envisioning future practices. The probings enter a circle of appropriation, enactment and inscription, involving designers and those designed for on equal terms. Imagining use and users is still the main issue, but both use and user are now moldable constructs, collaboratively crafted by all the participants involved.

We have earlier been arguing for the use of co-authored ethnographic video from work practice studies as a design material, both in terms of providing a background, and in terms of facilitating 'design moves' (Buur, Binder and Brandt, 2000). In more recent projects, however, we have seen that this perspective may push us too far towards 'getting messages through'. Working with video portraits, type examples and enacted scenarios, it is true that we have developed well-suited design formats. Yet, even if the preparation of this material was done collaboratively with the people we studied, we often found it difficult to 'open up' the material later. In a project called "Process Visions" we developed a more open-ended scheme. We had earlier been exploring possible design concepts for distributed monitoring and control, and now we wanted to confront the process operators at a number of different plants with our design ideas. Here, we included a group of operators, who had been actively involved in the installation of a highly modernized control room facility.

At each plant, we pursued ethnographically inspired fieldwork. After that, we arranged workshops focused on the exploration of the work practices at the different plants. Four or five process operators from each plant participated, working in groups with video material from their own plant. The video material had been prepared as to show sequences that we found interesting. We also
provided playing cards with a still frame and a time code for each sequence (Buur and Soendergaard, 2000). Many of the sequences showed process operators interacting either with machines, pumps, the substances being processed, or with colleagues.

Printed on each of the video cards was a time code referring to a specific snippet on a videocassette. As an example, one card showed one of the operators, walking by some large pumps, taking one glove off and holding his hand in a way so that he could feel that the fans were running. We also provided some empty cards, where the groups could add things missing in the video snippets. With this material, the groups started to create stories of a typical day at their plant. They were able to describe and discuss things that they had not been involved in, potential or imaginary scenarios. They posed questions to one another, developing an advanced understanding also of each other’s plants.

The work with shorter fragments, illustrating activities and personalities without having to give a full story with a beginning and an end, created more room for interpretation than the type of scenarios we had earlier been using. The fragmentation opened up for a situation where process operators and designers collaboratively could create stories, regardless of questions of ‘authorship’. This co-authoring was engaging for the participants, and allowed for related topics to be brought into the discussion.

The use of a more fragmented design material also opened for the mixing of activities from different plants. In a later internal session in the design studio, we started to play around with the ‘who was working where’, modelling fictive process plants in LEGO® using figures to represent the different process workers, a process which helped us to explore both the personalities of the process workers and the characteristics of the plants. In our case, this combining of persons, activities and places developed into a cross-programming strategy.

The unfolding of everyday life is an often neglected, yet rich source of potentials in the design process. When a telecommunication
provider wanted to collaborate around future services, we suggested the development of an everyday-perspective on their products and services. Instead of focusing directly on use aspects, we chose to stage an inquiry of the everyday practices of potential users. However, as an alternative to the tailoring of a number of field studies, we chose to re-use video material gathered earlier. Even though the material had little to do with telecommunication, it offered a number of strong portraits of persons in everyday situations. We made a selection of snippets, which expressed personalities, desires and values. Characteristic to most of the snippets was the discrepancy showed between what people said and what they did.

Together with a technological trend analysis and a list of potential products provided to us by the telecommunication company, the video snippets formed the ‘building blocks’ for three design games. In the first of these games, the “Trend game”, the participants looked at different trends in the light of everyday practices emphasized by video portraits. Stories were created by combining video portraits with ‘trend cards’. In the “Vision game”, the groups instead conceived of new services in pre-defined situations. Here, they arranged still images from the video portraits into imagined customers environments and situations, where specific services could be used and described. The “Scenario game” finally, let the participants design a service solution, starting off with a combination of an environment, a situation and a user, defined by the group. The game ended with an enacted dramatized story, which was video filmed.

The participants had no trouble working with material that they did not know beforehand. They filled the video snippets with meaning, and used the pictures much more “freely” compared to the process operators, probably due to the fact that the material here offered the “resistance” required for the participants to be able to look at their services from the point of view of more complex “users”. Through the design games, working with their concept areas, trends and solutions in a dialogue-oriented process, the participants were confronted with everyday-life in the present. The
workshop provided the telecommunication company with new models for evaluating strengths and weaknesses in their concepts, but also with options for further inquires into their customer needs.

More recently, in the COMIT project (Contextualization of Mobile IT), we have explored the possibilities of including potential users and real life contexts in the design of future mobile IT products and services. Beside the Space Studio members and three partners from the IT industry, three user representatives were invited to participate in the design project.

Initially, six ethnographic field studies were pursued, depicting the last working hours and late afternoon/evening of the participating user representatives. The choice of fieldwork methods was highly pragmatic and often improvised, depending on the situation at hand, either hasting to catch a train, sitting in a car on a bumpy road, attending a confidential business meeting, paying a visit to a noisy bowling center, or being at home, just to name a few. The methods changed from informal conversation, quiet observation, and shadowing, to formal interview. Each field trip lasted from three to six hours. This provided several opportunities to experience transitions between a myriad of different contexts – socio-cultural as well as geographical.

The participants were not enrolled in the project as objects of study, embodying ‘real’ mobile users. Rather, taking the cue from collaborative ethnography (Crapanzano, 1980) they were conceived of as co-authors of images of use. Furthermore, taking the participatory inquiry a step further, they were also actively involved in generating the images of each other’s use practices, a much more generative method than the conventional, descriptive and informative ones (Heat and Luff, 1992).

In preparing for a subsequent collaborative and generative design workshop, we wanted to avoid singular and conclusive stories of the three users representatives, and their worlds, as well as a freezing of the images before staging alternative interpretations.
Instead we prepared short video snippets of 1-3 minutes’ duration from the initial field studies. For each video snippet we printed corresponding playing cards with a key frame on it, acting as a physical “handle” to the video snippet. Returned cultural probing kits were also represented graphically on playing cards, either as statements, pictures, or short descriptions of experiences. For the participants in the workshop there was thus no pre-given sequence or order in the material. The fragmentary nature of the material rendered it highly open for alternative interpretations and reorderings.

To give an example: One of the video snippets showed two minutes of one of the user representatives on his way home from the office: *After having ended the business conversation on the mobile phone, he quickly enters the train for the suburbs, right before the train doors close. Picking up the mobile phone from his inner pocket again, he dials his home number to check on how his 12-year-old son is doing. No answer. After the ten-minute train ride he walks towards his car at the station, dialing again. Still no answer.*

Below we see a rough transcript of a dialogue between a salesman in his early twenties enrolled in the project as a potential user, a trained interaction designer in his thirties working in the IT industry, and a senior researcher from the Space Studio in her thirties discussing the material from the other potential user in the example above. He is simultaneously working in another group. They discuss his transformations back and forth between the role of businessman and father, for instance in the snippet mentioned above, where his son does not answer his calls. Although still in full business attire and comporting himself in his usual, professional way, calm and efficient, the facial expression is unmistakably that of a growingly worried father.

User: “...He has to be the perfect family man, and take care of the family. It is important to him.”
Interaction designer & design researcher: “hmmm” [agreeing]
Interaction designer: “It is as if he surfs the blade of this razor [makes a sliding movement with his hand] throughout the day. There is always something going on.”
User: “It is interesting to see how he has a stressed life and comes home and has a family with two kids, who mean a lot to him... Because that is obvious.”
Design researcher: “Definitely.”
Interaction designer: [points to a video card of the potential user in his business suit, but with his son’s very large toy snake around his neck] [everybody smile]
Design researcher: “Here is also the thing about the Rebel... I mean, that it is ok to walk around with it [the toy snake]. Some parents would prefer to put it away...”
[
Interaction designer: “It is an interesting border between work and family time”
User: “They are integrated worlds, I think”
Interaction designer: “A little work during family time, and a little private time during work”
(Rough transcript from COMIT workshop 1. Authors’ translation)

While it is obvious for the group that “working at home” is a theme in the material, the group participants begin to explore how this user might also be “homing at work”. The dialogue shows how the user taking part in the discussion is not restricted to remain in the role of prototypical user only supplying “the truth” about his own everyday life. Here, the user is active, especially together with the professional interaction designer, constructing and re-telling another users’ story collaboratively.

In the course of re-ordering the ethnographical material at the workshop, one of our stated goals was to introduce new, technological components as well. The industrial partners were prompted to come forward with technologies or products they believed in, material which we then broke down into a number of more generic functions, features or technologies, e.g. “text based chat”, “spoken memos”, “local wireless communication”, “remote printing”, etc., each of which was printed on a piece of
Lego/Duplo®. The ‘functions’ could then be rearranged to meet new configuration needs by technologists as well as non-technologists.

Exploring a possible concept named the “Family Messaging Device”, the group after a while returned to its own starting point: the initial video field material showing “the way home”. Here, the user’s son has left the activity centre after school, but is not at home as expected. The coordination of the user’s own activities with both those of his sons and those of his wife, was a recurrent theme in the video material, in the cultural probes and in the group discussions earlier at the first workshop. The coordination work was even more clearly highlighted as they went deeper into the particularities of the day-to-day communications within this family. During the workshop, the users responded to the design suggestions. The response varied: some concepts were found clearly relevant, some had to be modified and still others were rejected as altogether irrelevant. One of the results of this negotiation was the video scenario “a son’s request” which later was acted out by the persons that it involved, in their own environment (Binder, 1999).

As opposed to any strict separation of the observer and the observed, we have realized a plural authorship of the images of use. This is especially clear if we zoom out and take an overview of the design process. The process was centred round three intense collaborative workshops. The project went through three iterations of a basic three-step project cycle: 1) field studies of the user context, 2) collaborative design events, 3) design validation and refinement. The general idea behind the iterations is to facilitate a dialogue between design ideas and the field designed for. The initial fieldwork with the three user representatives provided a grounding of the subsequent collaborative design event where the participants’ diverse competencies were brought into play through the use of evocative design material.

The turn taking model constituted “the users” as persons supplying their partly co-authored stories to be re-worked and re-told by other stakeholders in the design process, while they were also themselves active in the re-working of the images of the other
users. Instead of freezing these images as generalized composite users, we brought them, together with the corresponding design ideas, back to the respective users to elicit the design setting’s back talk. Thus, the images of use, as well as the images of users, were kept alive and developed throughout the dialogic process.

Through the different projects we have aimed at expanding the image of use and users beyond stereotypes and simplification. In the project Process Visions we moved from nurturing only one common story of practice towards celebrating multiple stories, possible from different locations in the design project. The design workshop with the telecommunication company, showed that the idea of using fragmentary ethnographical design material could even work in settings other than the ones for which the material was originally intended. In COMIT we took the idea of multiple stories of practice further, by keeping them alive as a continued dialogue between user settings and design visions.

The approach to participatory inquiry outlined here is not concerned with finding the one golden nugget in the shape of a killer application. Rather, our approach has been the one of opening a broad window of opportunities, to be used as new starting points for design. Instead of settling for the first of good estimates of product coming along, this approach has allowed us to expand the design space by exploring the boundaries of it.

Based on the experience that openings for design emerge as a transitory window between an estranged view of what is and a familiarized gaze on what could be, we have been equally concerned with the generating of new visions of users and use as we have with the devising of new concepts for technological products. Every question of “what is happening here” is followed by the playfulness of a “what could happen next”. When finding the right balance between grounding design in existing practices, and evoking everything that could be different in a given setting, “the lid is ready to come off the magic box”.
The field studies we have brought to use in our design work have familiarized designers with “exotic” settings, such as sugar plant control rooms, refuges of college students, recruitment consultants in business meetings etc. Likewise, the techniques we have put to use in facilitating numerous design workshops have familiarized quite disparate groups of users with technical components, function lists, work flow diagrams, and architectural layouts. However, these unifying practices of familiarization do not stand isolated. They beg the need for estrangement.

Taking the cue from anthropology, we work consciously with the shifting of analytical perspective. Confronted with the exotic, we have sought to render it recognizable in its own terms, rather than reduce it to fit the categories of the known. When faced with the seemingly familiar we have sought to estrange ourselves from it, in order to see new connections and differences. By assuming in principle that the field under study is not well understood, most taken-for-granted truths are rendered contingent. As designers we are thus constantly reminded that the world we design for could be different. The dynamic relation between the familiar of the everyday and the estranged analytical perspective entails a powerful opportunity of seeing new openings for design.

References
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Paper Six: Exploring the Future
Ethnographic field material in design work

Abstract
Design is about change. To make something better that has to be altered. Wanting to explore new design possibilities I have turned to ethnography to learn how artefacts are used and how activities are carried out. Ethnography is about describing things as they occur, and does not provide any direct connection to an interaction design process, if the relation is wanted it has to be created. This paper is about how that can be done.

In this paper I want to raise a voice for using ethnographic field material as building blocks for constructing possible futures in collaborative design sessions. The approach presented here shows how it is possible to bring one part of the work usually done by ethnographers in to a collaborative design process. The examples given here are from different design project, where design groups are using field material to build and tell design scenarios, as a way of exploring design concepts. My standpoint is that the ethnographic field material should be a resource during the design process and analysis should be an integrated part of that process.

The design projects referred to has been carried out at the Interactive Institutes Space studio (Nilsson et al, 2000., Brandt and Grunnet, 2000., Binder and Messeter, 2001., Johansson et al 2002). These projects have involved ‘end-users’ and other stakeholders, participating in collaborative design processes.

Keywords
Work practice based design, ethnomethodology, ethnography, collaborative design

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Introduction
Design does not need to be informed by work practice studies, but during the last decade or two there has been a large interest for ethnography to inform design projects. The title of this paper is pointing at the need of integrating the analytic process of the ethnographer and the constructive process of the designer.

“He [the designer] does not separate thinking from doing, ratiocination his way to a decision which he must make later convert to action. Because his experimenting is a kind of action, implementation is built into his inquiry.” (Schön 1983 p.68)

In the quote above Donald Schön describes a designers work both as constructive and as an inquiry. The tools used by the designer referred to here is an architectural drawing, a sketch, but what if we let designers build with pieces of the field material from ethnographic studies? This of cause raises many questions about how to practically do this. What are the criteria for selecting the pieces to build with? How should a design team be composed to do this? Can it generate innovative ideas? ...

Related work
For many years several researchers have dealt with the problem of how to make ethnography inform design, all with the strong belief that knowing about the world is useful when changing it. This paper will not discuss whether this is a valid theme, but will go into the more specific question of how a design process can be set up to integrate and learn from ethnographic work. It has been within the CSCW (Computer Supported Cooperative Work) community the question of ethnography and design has developed. English sociologists (Hughes, et al 1994, Bentley et al, 1992, Randall et al, 1995) and American anthropologists (Blomberg et al, 1996, Suchman et al, 1999) have been the leading voices within the community both working with ethnography informed by ethnomethodology. In Scandinavia, the majority of the researchers within the ‘Scandinavian collaborative design’ tradition have adopted these ways of working (Kensing and Simonsen, 1997., Nilsson et al, 2000., Brandt, 2000., Binder and Messeter, 2001.,

The perspective At Blekinge Institute of Technology a group of researchers and teachers have developed both a master education and a research platform following the CSCW tradition in general, and the former Work Practice and Technology group at Xerox PARC in particular (Eriksén, 1998., Tap, 2001). Together with Malmö University a PhD-education in Interaction Design has been built-up, where Work Practice and Technology is one of three possible programs. This is the program I attend, and the approach that I suggest is inspired mostly by the projects carried out by the WPT-group.

In this paper, thus, I will go in dialog with two of the English sociologists' approaches. The reason for doing this is partly because these approaches have been made very explicit, something that makes them easier to discuss, and partly because the differences in perspective might provide a richer picture of possible ways to go about.

Plowman et al (1995) points out that many researchers have stressed the importance of work practice studies in design, but that the vocabulary used is modest. Terms as 'informed by ethnography' and 'relevance for design' is not saying anything about how it can be done, nothing about how design is informed. Traditionally ethnographers use 'thick descriptions' to describe a practice, without suggesting ways of usage of the description they provide. Despite a large interest in the ethnography-design relation, few concrete ideas in this direction have been presented. One exception is Crabtree (1998, 2001) who suggests one approach making use of stories for design. Recently another direction has won the interest of several researchers in the field, namely the patterns approach first introduced within architecture by Christopher Alexander. This approach is represented here by Martin et al (2001) and takes on the task of creating patterns that is 'families of resemblances' out of concrete instances from work practice studies.
Ethnomethodology
The ethnography that has dominated the CSCW community is ethnography informed by ethnomethodology (Shapiro, 1994). The English sociologists offer good arguments for ethnography to inform design, and have been stressing the importance of acknowledging social aspects and the complexity of work as important input for technology development. They have continued on the Ethnomethodology track laid out by Garfinkel, and states that they do not make any assumptions but only report versions of what has been studied. Ethnomethodologists claim that *everything is out there*, and the only thing they can do, is to give descriptions of existing practices, offering “accounts” of “the actual ways in which work is done” (Blythin et al, 1997). They do not consider themselves as designers, and do not want to give advise on design, but they can tell stories about what they have seen.

From detailed studies done by the English sociologists we have learned a lot about how technology actually is used in praxis, and this knowledge can in my view be of value when developing new technology. Hughes et al (1994) describes this kind of usage of ethnography as ‘re-examination of previous studies’ in contrast to different ways of doing studies for the specific design case. We can learn from it, but we do not come any closer to the context we are designing for. Button and Dourish describes the CSCW ethnography as a critic of technology and wants to see ‘how design can productively learn from ethnomethodology’. For the purpose of finding these new ways for ethnomethodology to inform design, they make a theoretical exercise in dividing possible ways of establishing a relationship between ethnomethodology and design (Button and Dourish, 1996). They found three categories: Learning from the ethnomethodologist, Learning from ethnomethodological accounts, and Learning from ethnomethodology. It is the third one ‘learning from ethnomethodology’ I will elaborate on here. ‘This alternative view is less concentrated with what the abstraction (or representation) is, in it self, focusing instead on what it can do and how it can be made to work.’ (ibid) In a later paper Dourish and Button (1998) uses the phrase ‘analytic mentality’ to describe the differences between ethnomethodologists using ethnographic
techniques, and others using the techniques. They exemplifies this differences with the manner 'selection of phenomena' is done and how 'topics for investigation' are chosen (ibid 1998). From my perspective it is this mentality that is the burning point. It is hard to use detailed accounts in design, since they tend to lead us into searching for problems that can be solved, but for a team of designers to apply the analytic mentality of an ethnomethodologist seems to be something that in a fruitful way can be weaved into the design exploration.

There are few contributions that report a bit more practical ways of making use of the ethnography/ethnomethodology to inform design. Crabtree (1998, 2001) uses story telling as a 'common sense method of linking ethnography and design' (p.236). Crabtree want to give ethnography 'a constructive role' in design still not regarding the ethnographer as one of the designers but leave the design work to designers (p.208). The design setting Crabtree sees is a collaborative setting where persons with different competences meet and each taking on the parts of the design process that they are trained to deal with. In Crabtrees approach the ethnographers role is to tell stories to the design teams, stories that together with the designers can be transformed into scenarios useful in the design process (p.224). The ethnographer taking on the role as 'bricoleur' bringing the stories he has into the design discussion, when appropriate (p.210). To relate this view with Button and Dourish (1996) categories, I would regard Crabtrees story telling as Learning from the ethnomethodologist: In this approach the ethnomethodologist is actively taking part in the design sessions and can choose what stories to tell. He does not deliver a package of accounts, instead he uses his understanding and overview to chose when and which story to tell. Since Crabtree keeps a strict division of labour, between ethnographer and designer, the designers do not get to navigate the material themselves but have to rely on the ethnographer. The approach offers a way of using the field material actively and the design process is given a prominent position, to which the field study can contribute when suitable.
Dave Martin and colleagues (Martin et al 2001) have chosen a rather different approach, using pattern-thinking building on the work Christopher Alexander did within architecture. Lately many computer system developers have adopted the patterns thinking as an extension of object-orientation. To continue to use the framework of Button and Dourish this approach would classify as Learning from ethnomethodological accounts. ‘The idea is to first find recurrent phenomena and to make these patterns available to designers’ (Martin et al, 2001) The patterns are to be drawn out of accounts, and a collection of patterns could be more easily accessible to designers than the accounts themselves. Martin et al (2001) presents two examples of patterns, ‘artifacts as an audit trail’ and ‘multiple representations of information’. The latter pattern consists of accounts from two work place studies, ‘ambulance control’ and ‘air traffic control’. The accounts within a pattern are not limited to have only one author; instead the pattern is better the more accounts and the more authors there are. Each pattern aims to bring light upon how different artefacts are used in the specific settings (Within the ‘multiple representations of information’ pattern one account included “The incident stack, the dispatch selection screen, the vehicle availability screen and the automatic vehicle location screen”, the other included “flight strips and radar screens ”). Whilst Crabtree is taking an active role in the design process, Martin and colleagues lift forward experiences about artefacts from earlier studies through the patterns. It is up to the designers to see possible similarities to what they develop, but when they do, there is a set of ethnographical examples showing the benefits and the backsides of artefacts used in different contexts. Martin and colleagues have developed a structure for the presentation of patterns that aims to make findings from studies more easily accessible for designers, and encourages others to use this structure to describe their findings.

**Building blocks**
The Building blocks referred to here are video cards (eg. paper cards that has associated video snippets to each card). At some instances we have used text to describe an occasion illustrated
with the video card, at other times we have only used references connecting cards with images to video clips.

Video Cards from different design sessions

The design process that we work within most often starts with some kind of request from an external party, and it typically involves workplace studies and ideas about technology from the external party. This approach has in different manifestations been used in many projects during the last few years. What binds it together is that we used sets of tangible paper/plastic cards representing video snippets from the field material. The idea with the cards is that they are used to build stories about possible futures. Connected to each card is a video snippet showing an
activity and gives a context. The number of cards in the sets has varied between 20-40 cards, and the video snippets are between 40 seconds and two minutes. Our work with video cards is inspired by the “Video Card Games” developed and described by Buur and Søndergaard (2000). The video material that Buur and Søndergaard are using in their video card game origins from usability test workshop, during the users was asked to install prototypes of heating regulators. Selected video sequences from these tests were viewed and “made sense of [...] for usability matters” (p.63). We adjusted the cards to try this technique with ethnographic field material in a design concept exploration workshop.

The thought is that the participants can use fragments from the studies to build their scenarios, and while building looking into the pieces in more detail. We let the workshop participants work with the design material as they find it suitable from their competent view. But it is in our case not merely to “play around with the truth” (as for example Gaver et al suggests for their “cultural probs” 1999), but rather to use “true” images of existing practices as “building blocks” for creating visions of the future. In our work the field material is not treated as “data” but as something to collaboratively explore and work with to build visions about the future (Johansson et al, 2002).

Most of the stories have been possible to create with the cards provided, but to open up the possibility for adding things that is not found in the design material. We have worked in different group constellations sometimes with many stakeholders, and at some occasions only with the persons that we have followed, the
future users. At one of the pictures above a process operator participating in a workshop have made a drawing and added an activity that that group found important for their story.

**Practical ways of bringing ethnography into design**

The three approaches presented in this paper all has in common that they strive to let design be informed by ethnography. Both the story telling and the pattern approach has in common that they bridge a gap between ethnography and design. The “building block approach” differs in that it does regard the relation between ethnography and design as gapless. We have taken one part of the analytic process usually done by ethnographers and brought it into the design process, and made it a collaborative task. To once again use the categories formulated by Button and Dourish, this approach would fit the Learning from ethnomethodology, which is different from the other approaches referred to.

![Learning from the ethnomethodologist](image)

**Learning from the ethnomethodologist, Learning from ethnomethodological accounts**

The ethnography process (to the left) is translated by the ethnographer into a format (in the center) that can be handed over to the design process (to the right).

![Learning from ethnomethodology](image)

**Learning from ethnomethodology**

The ethnographer role and the designer role meet in each other’s processes. The ethnography process (to the left) is not finished when the design process (to the right) starts. In this approach the ethnographic analysis and the design exploration are interweaved.
In the Learning from the ethnomethodologist category exemplified with Crabtree, the ethnographer tells a story from the field when he finds it appropriate in the design process. The ethnographer becomes a mediating filter and the only access to the field. In the Learning from ethnomethodological accounts category, Dave Martin suggests the pattern approach, which means that what is available during the design process is patterns illustrating concepts that the ethnographer has selected. Looking at the previous figure C is an interface standing between ethnography and design. What both Crabtree and Martin do is to hand over wrapped packages that they think is what the design process needs. The Learn from ethnomethodology approach as it is presented in this paper, is eliminating what is labelled as C in the figure. Instead of making extensive analysis of the material, and bring that analysis in to the design process, this approach suggests that it is the process of analysis that is brought in to the design process.

**Analysis in the design session**

The building block approach is meant for a Collaborative Design setting and suggests an explorative design process where ethnography plays a central part. We are using the field material for ‘maintaining reference to the context’ (Buur et al, 2000). The intention is to create a design lab where the participants trained in ethnography and the participants trained in design collaboratively can go about exploring field material in an integrated process of exploring design possibilities.

The following example illustrates how the analysis can be done during a design session. Before this design session an ethnographic study has been carried out. A workshop with process operators from three different plants has been held, and during that workshop some interesting themes has been identified. One of themes was meetings, and raised the question about how meetings take place, how they are established. Examples of other themes were “Rhythm” referring to differences in tempo during a process cycle and “Machines and things” raising the question of how a machine can communicate with the process workers. For this
design session we have invited designers who are familiar with process industry to look closer at how people meet in the process plant studied. Some of the ethnographic field material has been selected and made available as video snippets (approximately one minute long) and video cards labelled “Meetingcards”.

The group starts by dividing the "meetingcards" between each other, and agree on trying to make out a few categories, that can be the basis for some scenarios. After sitting quiet for a little while going through the cards individually, a discussion starts:

- **(A) Designer 1** “I can start, I have seen something with predictable meetings and unpredictable meetings.”

- **(B) Designer 2** “So there are places where you always can meet... It is perhaps, since [designer 3] has sorted them... Here we can see [one user] engaged in two activities that are equally important, and here [pointing at another meeting card] someone who is finishing an activity. It is something with how you can have a place in different circles [different group constellations, typically dealing with different problems] and also to be a periphery part of one circle.”
(C) Designer 4 “This is about the physical and the mediating.”

(D) Designer 3 “This is something planed and something unplanned.”
Designer 4 “This one is connected to that one [pointing at two cards, looking at Designer 1 who nods]”

(E) Designer 2 “There are a few things that is growing out of what we see here. It is something concerning how a meeting starts and is ended.”

The discussion continues... About two hours later the group has started to build a more coherent scenario.
(F) Designer 2 “You could imagine an intercom, where you meet on channel 27.”

(G) Designer 3 “That’s very much a chat-room.”

... “It has to be the circles that stands out, that you can control.”

(H) Designer 1 “It should not say the names of the persons but of the circles..”
(I) Designer 2 “Do you always speak to everyone in the circle? I don't think you do.”

(J) Designer 4 “I think that it is just like when we are sitting here, you don't speak to one person at the time, you just speak.”

(K) Designer 3 “Also it is an obligation, if you don't talk about what’s relevant you get lynched.” ...
Designer 3 “and I think it is unwise to talk only of speaking as the only way of communicating.”

In this part of the session the field material is not worked with directly, still it is a continuation of “the circle” a concept drawn from the material and when imagining an intercom system, it implies a direct reference to the context. The way of using the term “circle” rather than for example “work groups” means that the design group has to establish meaning and that they still are
working with the exploration rather than defining the phenomenon. Still the naming helps the group stay with and to focus on the phenomenon. This can be compared with what Blumer (1954) calls “sensitizing concepts” (p.7) that gives “a sense” and “guidance” in creating ethnographic categorize or instances.

In I and J the designers expresses what they “think”. Designer 2 imagine a possible future system and verbalize a hunch about how the praxis would look if this system were introduced as it currently had been described. He starts by formulating it as a question, that he gives a possible answer to himself. Designer 4 gives his possible answer that contradicts what designer 3 suggests. The reference he makes is not to the field material, but to his and his colleagues shared situation. Designer 3 continues on what Designer 4 started, with strong words explaining what he would expect from the process workers if the system were used in an inappropriate way.

The very next thing Designer 3 says is back in the technology discussion; to limit the discussion to spoken communication is not a decision that should be made at this time in the design process. This is an important point, since a designer has to keep in mind that the ideas he presents should be possible to do with technology. This constrain can be dealt with by thinking in examples, of how things could be done. The comment Designer 3 gives, helps the group remember this, and everybody agrees that this is not yet decided.

The swift between what can be seen as an ethnographic analysis and a design exploration happens seamlessly. To make distinct categorizations would mean that the dialog has to be broken down sentence by sentences, or even shorter fragments. On the other hand, a meaningful summery of what was learned about the work practice of process workers would be possible to do. Likewise it would be possible to identify design leaps, and how the design team works with the concept ideas.
**Video cards and scenarios**

We have used our video cards in different ways on different workshops. In some occasions the groups lay out the scenarios as storyboards, others use the cards for indexing what they base their scenario on. In the following example the latter is the case. Three persons are trying to look into R’s life, and more specific how he goes from “working mode” to “private mode”. We enter the workshop when the group is discussing R is in his music room, playing his guitar. Previously the group has made categorize, and this card is put in a group of cards where R is by himself in his leisure time.

| Designer 5: “We need to try to find a situation, where we can come up with a thing he can use.” |
| Designer 6 “I find this situation rather interesting. It differs significant from the other situations where we see R. There [the other situations] R is very much a businessman.” |
Designer 5 “What can we call this situation?”
Designer 7: “They have music in common”
Designer 6: “The private life of R, No”
“The music in R’s life”,
“The music as a sanctuary”.
Designer 5: “The music as a sanctuary”.
Designer 7: “The music as a sanctuary, perfect”

To start building on a scenario, the group begins with identifying one of the cards as interesting, cause it differs from the other cards where R is dressed as a “businessman”. They try to find a good label on the situation where the scenario will start. Designer 6 thinks out loud “The private life of R, no.. The music in R's life.. The music as a sanctuary..” The other two designers both immediately pick up on the “music as a sanctuary” suggestion. This is a typical naming process. In this way the group tries to find a working way of talking about their scenario. In the following short extract of a discussion, that takes place about fifteen minutes later, we can see that Designer 6 who suggested the “music as a sanctuary” continues on what Designer 7 start making up (without any direct reference to the material). Designer 6 reconnect what has been said to the video cards.
Designer 7: “What has happened before? How does the prologue look for this? Do he do this everyday? I don’t think he does this on Fridays or Saturdays, than he eats with the wife. Then she would be really angry.. Or is it when it has been one of those really bad days, Now I have to hit the guitar.”

Designer 6: “I think it is as you say, the last thing. He describes a combination of beauty and aggressiveness. This is the opportunity that he has.”

Designer 5: “Should we write this down?”
Designer 7: “I can be the secretary”
Designer 6 “I would like to use this card. Where he describes.. And this card to, they are connected..”

The Designers use their impressions and own experiences to fill the “gaps” that appears in scenario. This can be seen as a process of familiarizing the scenario. They are trying to make the scenario believable, or put in other words, to become comfortable with the scenario. My guess would be that it is easier to see alternative
scenarios once the initial is internalized. So far the scenario has not involved any new technology, and what the group will find out later is that they don’t want to ruin this scenario with technology, so instead they transfer it to a situation when R is on business trip, trying to keep some of the qualities that was found in the exploration of “the music as a sanctuary”. Once again we can follow the swift between using the cards for driving the scenario and “free interpretations” made to make the scenario useful for design purposes. As these short design session extracts show the groups are staying well grounded in the practice, along the way of envisioning possible futures.

**Ethnography in design**

Ethnomethodology strives to tell their stories from a ‘natives perspective’, explaining how work is socially organised from the perspective of itself; in it’s own terms. This I find most attractive for the design process. Further more, early ethnographers (e.g. Robert Park in 1920 cited in Crabtree, 2001, p.188) advocated ‘first hand observation’. In the approach presented here, the design team (including ethnographers) can get ‘first and a half’ hand observation from the video snippets (a half, due to the fact that it is filtered through a video recording and due to the selection out of the entire field material). And in this approach the ethnographers role would rather than being the analytic of the team, take on a role of keeping the discussion grounded in the material and make sure that the material is thought about from the perspective of ‘the natives’ (others can of cause also do this, but the experiences from previous work practice analysis seems to a good resource). This proposes a design process where all the participants take on the roles as designers. The involvement of ethnographers in this process is of crucial value due to their analytic experiences. Or as put by Shapiro “But they [the designers] have no magic means available to them for reconciling orthogonal perspectives or working through the detailed consequences of social scientific studies. It seems odd to impose the entire responsibility for the redesign of the work on systems designers while those whose specialty is supposed to be the analysis of work run for cover.” (1994). Technology developers often have strong theories about ‘the
world’ and how things should be done, and these theories are often motivated by efficiency. The sociological pragmatic perspective that the ethnomethodologists have brought to sociology is in my eyes one of the things that we could learn from the ethnomethodologists and apply in way we work with technology development. The role of the design artifacts (e.g. video cards) are that they function as the building blocks, and in due to what these building blocks are loaded with, the design team will be confronted by the work practice, all through the design process.

Ethnomethodologists have successfully developed ways of working with field material, and here we try to bring some of these ways into the design process. The ambition is to let the work in the design process to stay close to the field material, striving to adopt an ethnomethodological way of looking at work. The notion of ‘seen but unnoticed’ is sometimes used within ethnomethodology to explain the benefit of careful observational studies, but the same words could be applied at design. Talking about mockups and prototypes Ehn reflects over what makes these design artifacts good: ‘If the design artifacts are good, it is because they help users and designers to see new aspects of an already well-known practice, not because they convey a theoretical interpretation.’ (Ehn, 1988 p.113) As designers one looks at the existing practice for the purpose of change, and what one want to see is the ‘seeds of the future’, well-known things and practices that just are waiting to be noticed. The approach presented here is practical, perhaps pragmatic, in its nature choosing, and picks fragments of ways of working from one discipline and transfers it in to another. Button and Dourish explains that ‘learning from ethnomethodology’ is ‘not a link between theory and practice, it is a link between theory and theory’ (1996). I have claimed that the approach presented here is of this third category, but complimenting to linking theory to theory, practice has been linked to practice, and design has ‘learned from ethnomethodology’.

Discussion
In this paper I have advocated for the active use of field material in collaborative design workshops. The material that has been used
in this case is video. We could have chosen other means of bringing the field study into the design session, but we have not since video has suited our purposes well. Video as a material is very rich, a short snippet can contain several different fragments for a story, it can provide a picture of the context, and mediate feelings, it can show one or many activities, and so on. It is not the aim of this paper to go into detail about how to select video snippets that can become design material, but there might be fruitful to describe some of the thoughts about the material. The basic principle that we have worked with is that the work practice should be highly present in the design work. The context should be obvious, and activities taking place made observable. Often we have invited the persons studied to participate in the design sessions, and they have been able to add things (as in one of the pictures above) to what is represented in the material. We do not regard this as something we failed to include in the design material, but as confirming that the design material works and at the same time opens a possible way for these people to make their voice heard in a rather concrete way. Ehn explains that design artefacts bring “[...] earlier experiences to our mind and it 'bends' our way of thinking of the past and the future.” (1988, p.110), and this is exactly what we strive to achieve. In a design session the nature of the design material and the task at hand opens gateways to learning more about the work practice. By using video snippets as building blocks in the exploration of future possibilities, keeps the process in a firm grip by the praxis studied.

A question that might arise from the use of this kind of approach, is whether the field study could or should be altered to match this way of working? Currently we are working with this approach, but with field material that has been gathered for other purposes that our current design cases. This means that the approach gets more similarities with Martin and colleagues’ (2001) ‘re-examination’ of previous studies. This slightly changed approach might be better suitable for large user groups, where the field material can function more like personas, than the users.
Here I have used the categorization borrowed from Button and Dourish (1996) as a theoretical tool to look at differences between different approaches all striving for ethnography to inform design. In practice the categorizations are not isolated ways, most approaches have traces from all three categorizes. Still I think that the categorization can help in seeing differences and similarities between different approaches to work practice based design, even though I in this paper have chosen to present only one example in each category. From my perspective why we wanted design to be informed by work practice in the first place was the ‘grounding in praxis’ and what we can learn from ethnography informed by ethnomethodology is ways of primary the ‘analytic mentality’, breaking normative thoughts and preconceptions about how the world “should” be.

In this paper I have stressed the active use of ethnographic field material in the design process, this to combine the analysis and the design to an integrated process.

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Paper Seven: Contextualizing Mobile IT

Abstract
Information and communication technologies are moving into the era of ubiquitous computing, with increased density of technology and increased mobility and continuity in use. From a design perspective, addressing the accommodation and coordination of multiple devices and services in situated use across different contexts is becoming increasingly important. In the COMIT project, ethnographic fieldwork has been combined with participatory design engaging users, designers and researchers in order to explore mobile IT use as well as the design of mobile IT concepts. Four selected scenarios from the project are presented and discussed regarding implications for the design of mobile IT devices, with particular focus on (1) coping with multiple social contexts, and (2) the configuration and connectivity of mobile devices.

Keywords: Mobile technology; participatory design; ethnography; use qualities; contextual factors.

Introduction
Information and communication technologies are moving into what Weiser (1991) termed ubiquitous computing, with ubiquitous access to digital information through a wide range of mobile and embedded technologies connected through wireless global networks. Research in ubiquitous computing, and the related fields of tangible interaction (Ishii and Ullmer, 1997) and augmented reality (Wellner et al, 1993), have arguably redirected the agenda for designing mobile IT. The main issue addressed has been the accommodation of a higher density of technology by letting interaction with information and communication devices blend in with our everyday ways of ‘being in the world’ (e.g. research into issues like context awareness; speech, gesture and handwriting recognition; etc). From a user perspective, there are a number of
consequences resulting from this development. The number of personal devices typically carried by the mobile user is increasing. Using multiple devices in a dynamic landscape of pervasive technologies introduces another layer of complexity for the mobile IT user. Also, the role of each device is becoming more dynamic as the connection to other devices may increase the number of available functions. A simple example is that a cell phone on the market today supporting Bluetooth™ can be configured as a remote control for a presentation running on a laptop computer. Finally, the technological development not only increases technology density and connectivity but, perhaps more importantly, it increases mobility and continuity in IT use. An important consequence of being continuously connected is that as we move through different social contexts in our everyday life, we find ourselves omni-present in multiple social contexts, each with its own activities and roles. We used to have a clearer connection between places and activities which kept work and private life apart, but the wireless technologies are shifting the social meaning of places and locations (Brandt and Grunnet, 2000). For instance, business travelers may seamlessly shift between work activities, their personal lives, and the logistics of being on the move – an interplay between planned and improvised action referred to by Sherry & Salvador (2002) as the ‘jazz of going mobile’ (ibid, p.112). However, the designer is coming under increasing pressure to accommodate the coordination of multiple devices and services across different contexts. In particular, the dynamics in use makes it increasingly difficult for the designer to predict use situations, calling for better approaches to build an understanding of problems and possibilities in the early phases of the design process. In the project COMIT – Contextualization of Mobile IT – we have aimed to develop an approach where rapid ethnography and participatory design are combined to explore issues in mobility across different contexts in order to better inform the design process. This study and approach run over a five-month period has brought together designers, researchers and prospective users to develop ideas and concepts for mobile IT based on ethnographic field studies. This paper describes the process and outcomes of this collaborative
exploration and discusses four selected examples indicating the potentials in our approach to inform mobile IT design.

**Wrestling the cliché with the ‘Normadic user’**

Mobile technologies have introduced the notion of the ‘nomadic user’. In everyday marketing the dominating cliché of the nomadic user seems to be the business person aged 30 to 40 and always online. They handle the demands of work and family life simultaneously and with equal efficiency. Even if connectivity and location-based services receive a lot of attention in the mobile technology industry, the dominating rhetoric still revolves around providing the functionality of the conventional office environment ‘anytime and anywhere’, regardless of contextual factors. The nomadic user handles multiple contexts, not by adapting to the particularities of each use situation, but simply by disregarding contextual factors. The business meeting can take place on any forms of transport as well as in the office by providing wireless access to digitally mediated information regardless of time and place. The user becomes nomadic not by adapting to context but rather by detaching from it – ‘the context-free user’. In contrast, later research in mobile technology use has underlined the social shaping of technologies (Taylor and Harper, 2003) and the unexpected ubiquitous use of SMS being an often referred example. The use of SMS by young people tends to be driven by normative motives rather than the system being ‘easy, quick and cheap’ (ibid). Earlier research has pointed out how mobile technology may blur the border between different contexts. In particular, the border between work and leisure has been addressed and results are inconclusive. According to Gant and Kiesler (2002), work related issues are expected to invade private life, whereas Harper (2001) claims that mobile technology, allows private life to invade the work domain as well as public spaces. As a starting point we acknowledge that mobile users typically participate in many different social contexts, some being part of private life and others being work related. There have been attempts to formalize the kinds of social contexts we participate in. Rowson (2001) suggests a two-dimensional scenario space with a
matrix of relationship (Community, Formal Team, Casual Team, Individual) vs. role (School, Recreation, Family, Work, Spiritual). However, such general formalizations fail to account for qualitative differences between the many social contexts we encounter, as well as not being able to recognize the qualitative differences in the many forms of participation that may be applicable for each context. Furthermore, mobile technology transforms our conception of space beyond the mere geographical aspect of being mobile. An example would be travelling by train. Listening to a person talking on a mobile phone it would be questionable if we are part of the technology mediated ‘social space’ established between the caller and the person called. In their study of business travellers Sherry and Salvador (2002) acknowledge the need for handling omnipresence in multiple contexts and go on to claim that mobility in itself often requires users to switch between planned and improvised action. They identify three experience types where the need for handling the interplay between plans and improvisation is particularly prominent: (1) handling the logistics of being on the move, e.g. finding alternatives to a cancelled flight; (2) dealing with work, e.g. compensating for documents or other resources not available in a mobile situation; and (3) managing personal affairs, e.g. staying in touch with family or managing household logistics.

In order to cope with the challenges of ever changing contexts, social as well as technological, a dominating theme in mobile computing research has been context awareness. In context aware systems, contextual information is used to adapt to changing conditions and provide functionality in order to respond to the user’s specific needs in a given situation. For example, in the ‘nomadic radio system’ (Sawhney and Schamndt, 1999) alert strategies for incoming messages are dynamically adapted to the ‘interrupt ability’ of the user. Location has been identified as the key contextual factor for mobile systems (Dix et al 2000). However, an ideal context aware system would account for five contextual factors, according to Abowd & Mynatt (2000) who is the user and who else is present in the immediate environment; what is the user doing; where is the user located; when – at what time is this happening; and why – what is the emotional state of the user. In this perspective, the vision of the nomadic user is based on
continuous adaptation of technology to the specific needs of the current situation. The user becomes nomadic by the system’s capability of adapting to constantly changing contexts. However, it is difficult to make reliable predictions of these changes in user needs, based on contextual information picked up from the environment. The ‘nomadic radio system’ (Sawhney and Schmandt, 1999) uses real-time analysis of the auditory scene to generate context information. Continuous speech from several people is interpreted as an indication of a conversational situation. This strategy presumably could break down in a noisy environment. If we consider how humans interrupt an on-going conversation with an important message, they would rely on a complex system of cues deeply rooted in social behaviour to do this.

The concepts for mobile IT developed in the COMIT project have deliberately been geared towards seeking alternatives to the strategies of context aware computing. The aim being to keep the user in control in order to make technology understandable rather than letting it disappear behind an automated technological response. In an earlier project we have addressed these issues in a specific work context (Nilsson et al, 2000). A handheld device was designed to support process control operators at a waste water treatment plant. This device allowed for multiple readings from various locations in the plant to be temporarily monitored in order to analyze potential or existing problem situations. Our aim in the COMIT project has been to pursue user control in mobile IT use. Of particular importance is the investigation into multiple contexts, relating to both work and private life.

The COMIT Project
As mentioned above, the project combines ethnographic fieldwork with participatory design techniques as an approach to exploring various avenues in mobile technology. The primary aim was to develop a deeper understanding of the contextual issues in mobile computing that we are increasingly encountering. Researchers, designers and users collaborated to investigate these avenues in mobile computing through developing interactive concepts for mobile IT. The project was preceded by a pilot workshop with the
participation of Sony Ericsson Mobile Communications AB and Telia Research AB. The designers participating in the main part of the project came from three industrial partners:

- Sony Ericsson Mobile Communications AB;
- Anoto AB (digital pen technology); and
- Decuma AB (handwriting recognition software).

Concise studies of three users and the technology they employ have been conducted. Existing personal devices were not prescriptive to the design process. By inviting the users into a collaborative design process a richer view of their relevant needs was attained due to scrutinizing existing mobile products as well as future possibilities.

Table 1. The COMIT process.

<table>
<thead>
<tr>
<th>Iteration</th>
<th>User context</th>
<th>Collaborative design</th>
<th>Validation / refinement</th>
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<tbody>
<tr>
<td>1:st</td>
<td>Field work</td>
<td>Pilot workshop</td>
<td>Scenarios</td>
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<tr>
<td>2:nd</td>
<td>Suppl. fieldwork</td>
<td>Workshop #1</td>
<td>Scenarios, concepts</td>
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<td></td>
<td>Cultural probes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:rd</td>
<td>Ethnographic enactment</td>
<td>Workshop #2</td>
<td>Elaborated concepts</td>
</tr>
</tbody>
</table>

In the project concepts were developed addressing the individual needs of the three participating users as well as keeping a broader perspective of mobile IT use in mind. We deliberately worked simultaneously with form, function and interaction in parallel from the very beginning of the project. The design process was event driven (Brandt, 2001) including three iterations (see table 1) where each iteration involved activities in the user’s own contexts (left column), collaborative design events involving designers, users and researchers (middle column), and finally validation and refinement after each workshop (right column).
First iteration

Fieldwork – ‘On the way home’

The three users selected were from our network of contacts from previous projects. We were not specifically looking for early adopters of mobile technology but people with a competency in cell phone use, including the use of SMS. The theme for the initial field study was ‘On the way home’, placing the ordinary ‘man in the street’ on the border between work and leisure. Helle, Ronny and Rickard (see figure 1) were followed, observed and interviewed during their last working hours and through evening. The aim was to capture a material providing a rich description of their everyday doings with a particular focus on how they moved between different social contexts. Six field trips were conducted, each covering three to six hours, and recorded on video camera. The video material was edited into short video clips to be used in the following pilot workshop.

Pilot Workshop – Developing Scenarios

The purpose of the pilot workshop was to explore the possibilities of collaborative inquiry into the dynamic needs of mobile users. Researchers, designers and users were brought together to build future scenarios for Helle, Rickard and Ronny from the ethnographic material collected, with a focus on the needs of mobile users. The pilot workshop also served as an introduction to our way of working with field material and user involvement (for more details, see Brandt and Messeter, 2004; Johansson et al, 2002). As a result of the pilot workshop the partners reached an agreement for future engagement.
Second iteration

Supplementary Fieldwork
After the pilot workshop, supplementary field visits with two of the users, Rickard and Helle, took place. Also, inspired by Gaver et al (Gaver et al, 1999), the field visits were supplemented by cultural probing kits. These were given to all three users in order to add more depth to user descriptions as well as opening new perspectives. The cultural probing kit consisted of a disposable camera, writing utensils and four tasks where the users traced their whereabouts during one week. For instance they took photographs of high- and low-tech products that were important to them. They also took photographs of places inside and outside their home where they liked to be. The results of these probing tasks added more nuances to user descriptions, communicating aspects of the user’s dreams, hopes, fears, aspirations, and frustrations. This kind of field study differs from traditional ethnography. However, the approach used was efficient in gaining an intimate knowledge of the users and their life worlds.
Workshop 1
The aim of the first workshop was to produce future scenarios for the three users, based on the field data collected, demonstrating how mobile IT could support the users in everyday activities across different social contexts and situations. Workshop 1 had three sessions: getting to know the users by exploring the field material (text, images and video from the ethnographic fieldwork and probing kits); disassembling products from the industrial partners into a list of modular functions that could then be rearranged to reflect new configuration needs; and developing future scenarios based on the first two sessions. The work was carried out in three groups, each working with material from one of the users. However, the users did not work on their own material/scenarios. A starting point for developing mobile IT concepts in the first workshop was that they should utilize technology available today or in the next six months. Each of the industry partners was asked to provide a list of functions available in current or coming products that they wanted to bring into the design process, thus extracting functions typically supported with today’s technology. A total of twenty functions were provided. Examples include: write and store formatted text; draw/sketch; read barcode; display video; play music; control other device. For each concept a physical shape was chosen among twelve block foam models with generic shapes. During the first workshop two to four scenarios were produced for each user giving a total of ten scenarios with associated design concepts.

Validating/refining Scenarios And Concepts
After workshop 1 the concepts and scenarios generated, needed to be grounded in the world of the intended users for validation. First, researchers elaborated on concepts from the workshop in more detail and discussed them with the users in separate meetings. Some concepts required further elaboration together with the users; other concepts were considered inadequate by the users and subsequently dropped. Table 2 summarizes the design concepts after verification with the users. Since the list of functions presented at the workshop came from current or coming products, some of them matched off-the-shelf products currently on the
market, e.g. the ‘image device’. However, in the process we avoided talking about the ‘image device’ as a digital camera to encourage new ideas rather than getting caught in the framework of existing standard mobile products.

**Third iteration**

**Ethnographic Enactment**

The next step was to create enacted scenarios together with the users in their everyday contexts. We have earlier worked with ethnographic video as a design material in which we capture prototypical work situations which prompt new design ideas (Binder, 1999; Brandt and Messeter, 2004; Buur et al, 2000; Johansson et al, 2002). Initially, the users were asked to give each concept a shape using foam material and tools supplied by the researchers. Secondly, an everyday situation was selected together with the user and a scenario was developed where the developed concepts could apply. A video recording of the scenario was conducted with the user in an informal and improvised way. The users were ‘acting’ as themselves using the foam shapes as props in their own everyday environments. The video scenarios, comprising between three and eight minutes each, were prepared as design material for workshop 2.

<table>
<thead>
<tr>
<th>Table 2. Preliminary concepts developed.</th>
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<tbody>
<tr>
<td><strong>Concept</strong></td>
</tr>
<tr>
<td>User: Helle</td>
</tr>
<tr>
<td>Image device</td>
</tr>
<tr>
<td>Image editing tablet</td>
</tr>
<tr>
<td>Image editing tablet, foldable</td>
</tr>
<tr>
<td>Portable printer</td>
</tr>
<tr>
<td>User: Rickard</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Reminder</td>
</tr>
<tr>
<td>Social network communicator</td>
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<tr>
<td>Soft key</td>
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<tr>
<td>User: Ronny</td>
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<tr>
<td>Connector</td>
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<tr>
<td>Day care communication device</td>
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<tr>
<td><strong>Family messaging device</strong></td>
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<tr>
<td>----------------------------</td>
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<tr>
<td><strong>Video device</strong></td>
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**Workshop 2**
This workshop was divided into two parts: exploring use experiences and from use experiences to form and function. The work was carried out in three groups facilitated by researchers with participants from industry, this time working together with the user described in the working material for the group. In the first part, exploring use experiences, the groups were asked to walk through the enacted scenarios and together with the user identify the use experiences regarded as most important in each scenario. In the second part, from use experiences to form and function, the groups worked with the mobile technology concepts introduced in the scenarios. Starting with the identified use experiences, the goal was to open new design ideas and to elaborate on the concepts, regarding form as well as function. Moving from concepts grounded in enacted scenarios to identifying expected use experiences was an attempt to avoid closing the space of available design solutions prematurely by temporarily elevating the design focus to a higher level of abstraction.

**Contextualizing Mobile IT – four examples**
The fieldwork conducted in the project provided rich descriptions of our prospective mobile IT users, how they handle different contexts and how mobile technology may support them. Furthermore, the collaborative design process helped us in refining this understanding which was further expressed in the concepts and ideas developed in the collaboration. The following sections present four examples illustrating aspects of mobile IT use that we find relevant for designing mobile technology.
Multiple Devices – Multiple Identities

The first example is taken from our fieldwork. Our field data revealed several cases where users were already fluent in handling multiple devices and to some extent they also shifted between different social roles. However, our interpretation revealed that these smooth transitions are more as a result of their abilities as human beings and professionals in adapting to the situation rather than from good design. The situation illustrated in Figure 2 with Rickard (the sales agent) is extracted from a few minutes of his daily work. This situation was identified already in the pilot workshop as illustrating the switch between different social contexts. Rickard has four devices at his desk: a PC, a PDA, a cellular phone and a private cellular phone. In handling the situation Rickard moves swiftly back and forth between three roles: sales agent, colleague and friend. With the same agility he switches between using his four devices. In the video Rickard’s role switching is evident in his voice, his manner of speaking and his posture. When dialling a customer he uses the moment before they answer to put a question to a colleague on a company policy matter (3a-b). As the customer answers he interrupts his conversation with his colleague who stays, apparently expecting them to finish the conversation in a short while. While he is waiting for his call to be put through from the switchboard to the right person, he finishes the conversation with his colleague (3c-d). In this sequence Rickard is switching between his business-like manner in talking to the customer and his more informal style of conversation with his colleague.

The same role switching is apparent in the second half of the sequence where Rickard, during working time makes a call to a friend, switching to a mode of talking and gesturing that displays Rickard as a private person (3e-j). When a customer calls during his conversation he briskly interrupts his friend and hangs up to switch to his sales agent role and takes the call. Finishing the conversation would most probably be handled differently, had he been interrupted by another private call or the approach from a
colleague wanting to talk to him. Finally, Rickard’s fluency in switching between using

<table>
<thead>
<tr>
<th>a) (Sales agent) Rickard calls a customer.</th>
<th>b) (Colleague) While waiting for the customer to answer Rickard questions his colleague.</th>
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<td></td>
<td>c) (Sales agent) The customer answers and Rickard interrupts his conversation with his colleague, but she stays.</td>
</tr>
<tr>
<td></td>
<td>d) (Colleague) Rickard is waiting to be put through and uses the pause to finish his conversation with his colleague.</td>
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<tr>
<td></td>
<td>e) (Sales agent) Rickard is put through and completes his phone call.</td>
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<tr>
<td></td>
<td>f) (Friend) Rickard fetches a number from his private cellular phone and calls a friend.</td>
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<tr>
<td></td>
<td>g) (Sales agent) Rickard’s conversation with his friend is interrupted by a customer call.</td>
</tr>
<tr>
<td></td>
<td>h) (Sales agent) Rickard confirms an appointment with the customer.</td>
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</table>
different devices clearly indicates that this is part of Rickard's everyday working life. Handling multiple devices and identities in communication seems to come natural to Rickard. Early research in context awareness has focused on geographical position and identity as the major contextual factors (Abowd and Mynatt, 2000). In this example Rickard is not mobile, but the fact that he uses mobile technology enables him to be present in multiple social spaces and, as Gant & Kiesler suggest (2002), the boundary between work and other activities is then blurred. Abowd & Mynatt suggest that identity should be expanded to include other people in the environment as ‘we tailor our activities and recall events from the past based on the presence of other people’ (Abowd and Mynatt, 2000 p.9). Arguably, being omni-present in multiple social spaces suggests an even more complex picture where different identities come into play. Rickard’s communicative behaviour and priorities is dependent on what role he is currently engaged in. Each social role brings with it a social context influencing behaviour in the specific situation. In conclusion, the dynamics displayed in Rickard’s context, while maintaining the same geographical position, suggests that our omni-presence in multiple social contexts – our ‘social mobility’ – is an important part of understanding contextual factors of IT use.

The Tap On the Shoulder – Taking Multiple Social Roles
The second example, also captured in our field data, shows Ronny, a head-hunter recruiting professionals. In this situation Ronny is
having trouble reaching one of his sons Jakob. Ronny is a frequent user of mobile IT since his professional role requires him to be available at all times, and he rarely switches off his mobile phone. His wife allows him to take business calls at home but does not fully approve. While commuting by train Ronny is calling home to see if his son Jakob is okay. Jacob is old enough to get home from school on his own, but Ronny always calls on his way home to check on him. This time there is no answer. Getting off the train Ronny tries again, but there is still no one home. He picks up his second son at the day-care centre. On arriving home he phones the activity centre where Jakob goes after school to inquire if he is there. He is not. Ronny starts walking around the neighbourhood searching for Jakob. He finally finds Jakob playing with some friends. This situation describes one of eight short ethnographic video stories used in workshop 1. It introduces Ronny as a user and his scenario as design material when inquiring into the needs of his situation. This scenario opens a possible concept called the ‘personal messaging device’. This handheld device offers synchronous messaging (e.g. SMS or email). This would then allow users to read and write digital messages, anytime and anywhere via text or voice, the basic functionality being to allow people to send short messages and to receive quick responses. This would therefore synchronize activities between people who aren’t in the same place at the same time. After the workshop, together with Ronny, the device was further refined and validated. As part of the preparations for workshop 2 Ronny and his son Jakob role played a video recorded scenario in their everyday contexts illustrating the use of the ‘personal messaging device’. Here Jakob uses the device to send a quick request to Ronny asking if he can go to a friend’s house and play after school (see figure 3). Obviously, Ronny constantly occupies (at least) the two social roles of being a business professional and father.
To Ronny, staying in touch with his loved ones is of high priority at all times, although it should not conflict with his role as a business professional. The information to be communicated within the family when they are not present in the same context is often short messaging, e.g. confirming that Jakob is allowed to go to a friend's house after school. At best confirmation should be quick. For Ronny, being in a work setting, the request from Jakob is an example of how one can shift seamlessly between work activities and personal activity as referred to by Sherry & Salvador (2002). According to Ronny, his personal life is compromised when in an important business meeting. The existing technology of email or SMS would require too much attention as well as compromising his business etiquette. This is one scenario Ronny cannot manage. However, a ‘personal messaging device’ would enable him at a
glance to fulfill his parent role by simply answering ‘yes’ or ‘no’ to Jakob’s request without compromising his business etiquette.

The ‘personal messaging device’ has similarities with the ‘Quiet Call’ concept developed by Nelson et al. (2001). They developed a technology allowing users to respond to phone calls without talking aloud. Nelson et al. have primarily focused on how to have private conversations while in public places and suggest the concept ‘Quiet Calls’, which allows the caller and callee to use separate modes of communication. The participants can use a quiet mode, whereby it is possible to listen to the caller and answer through three buttons with pre-set configurations of pre-recorded answers. While ‘Quiet Calls’ allow for wide variety, the purpose of the ‘personal messaging device’ is intended only to support relations only between a limited number of people, often the family. At the second workshop, the use qualities of the enacted scenarios identified together with Ronny include: ‘Semi-asynchronous communication’; ‘Feeling secure: where is Jacob?’; ‘Invisible bonding’; ‘Supporting family planning activities’; ‘Allowing for a rapid response’. From Jakob’s perspective, the primary use quality is to have ‘easy access to his parents’. He wants to be able to ‘tap dad on the shoulder’ at any given time. Using the ‘personal messaging device’ Ronny can respond discretely to a short message from his children. For Ronny this could be handled either by a separate device or as a service implemented in his mobile phone, whereas Jakob being too young for using a mobile phone it would require him to use a simpler device for rapid asynchronous communication. To summarize, the ‘personal messaging device’ was based on rapid ethnography where we experienced Ronny worrying about his son’s whereabouts while on his way home from work. This scenario and concept highlights some of the challenges in trying to cope with multiple social roles and contexts. An important quality of the device is the security that both Jakob and Ronny have when needing to communicate with one another – i.e. a ‘tap on the shoulder’ works both ways.
Sharing Information – Compiling And Displaying Information On the Move

In the following three connected scenarios, Ronny and his colleagues demonstrate how they would like to use several mobile devices to capture, compile and share information about a job vacancy (see figure 4). The first scenario takes place at the client’s office in a nearby town, where Ronny’s two co-consultants meet with a client (here played by Ronny) to establish their recruitment needs for a new position. In the second scenario, still being at the client’s office, the two co-consultants compile information directly after the meeting, send it to a shared workspace as well as alerting Ronny to the updated information. Finally, the third scenario shows Ronny accidentally meeting one of his listed candidates (here played by Ronny’s co-consultant) at a café and is able to present her with information on the vacancy. The video scenarios were part of the session about exploring use experiences in the second workshop. To Ronny the most important use quality in these scenarios was that the mobile technology facilitates a direct mediation of information about a job position from a client to a possible candidate. He valued the efficiency of handling and sharing digital material. He regarded the on-the-spot video recording of the client presenting the job position of particular value. To the best of his knowledge this had not been done by anyone before. The video clip would then allow Ronny to observe potential candidates while they are viewing the job position on offer. According to Ronny, watching the candidate's immediate response to the recorded presentation gives valuable information about the candidate’s level of interest. Not least, the facilitation of an ‘asynchronous meeting’, though supporting only one-way communication, saves valuable time in the recruitment process, according to Ronny.
Scene 1: Client meeting

a) Ronny’s two co-consultants meet with a client who describes his recruiting requirements.

b) By the end of the meeting the client is offered the possibility to record a brief presentation of both company and the position on offer.

c) The recording is made using the ‘video device’.

d) The client requests Louise to do some quick editing on the spot using the ‘video device’.

Scene 2: After the client meeting

a) Emma scans both her notes and an organization chart from the client using the ‘handheld scanner’.

b) This data is sent to a shared workspace directly from the ‘handheld scanner’.

c) Ronny receives a message about the updated files on his ‘personal messaging device’.
Scene 3: Unanticipated client meeting

a) Ronny is having an unanticipated meeting with a candidate for the recruiting assignment. He wants to display the video recorded presentation of the position on offer.

b) Ronny retrieves the video clip from the shared work space using his ‘personal messaging device’. The video clip can then be viewed on his palmtop.

Figure 4. Sharing information.

These scenarios serve as a good example of how user's role playing in scenarios can identify needs that can be supported by a set of devices with simple functionality. These devices may be off-the-shelf products or products for release in the near future. The ‘video device’, ‘handheld scanner’, ‘personal messaging device’, palmtop and shared workspace with wireless access are configured to act in concert to provide communication between users driven by the particular needs of a specific context – the mediation of information between a client and a job candidate. Sherry and Salvador (2002) identify the creation of information in digital form as one of the most under-supported activities for mobile professionals. In their study users lacked support for simple tasks like taking notes or scrawling brief messages. The PDA was regarded as too difficult to use for data entry beyond simple contact information and the laptop too slow to start and cumbersome to use for these tasks. This is in line with the feedback from the users in the COMIT project. In general they found today's devices too complicated to use in concert for communication.

Configuring a ‘Portable Print Shop’

Similar to the previous scenario, the following shows how a set of devices with basic functionalities are configured for a particular context (see figure 5). As a fashion designer, Helle renews her
collection every year. In an enacted scenario Helle demonstrates how she uses three concepts – the ‘image device’, ‘image editing tablet’, and ‘portable printer’ – to produce a catalogue for a retailer, showing a selected set of garments from her collection with annotations. The resulting personalized catalogue contains pictures and information about the garments the retailer has showed interest in, together with prices (which may be specific for the retailer) and information about possible variations, colours, etc. The use qualities identified in the second workshop for the above scenario pointed out the added value to the customer of having a ‘personalized catalogue’. Helle operates in a competitive market and in order to promote her products she regularly visits companies to present her current collection. However, fashion designers in general promoting small collections cannot afford to produce complete catalogues.

For Helle the chances of selling products increase if she can leave documentation of her collection with the customer for future reference. The ability to annotate the images with agreed prices and other information, and thereby personalizing the catalogue as a response to direct questions from the retailer, improves her customer relations and gives her a temporary competitive edge. On a practical level, the catalogue also serves as future reference to what she has offered to each retailer. This example shows how mobile technology can be powerful in supporting the contextualization of information content. More important, Helle configures a set of devices, each with simple functionality, to perform functions based on the needs of a particular context. The combination of the ‘image device’ and the ‘editing tablet’ originated from discussing how her digital camera could be used in her atelier. In this case, annotated photos of garments in production could be sent to customers for perusal. However, in this scenario Helle expands this idea by bringing together three devices, all of which have simple functionality that is available in
a) Helle shows her new collection to Elisabeth, a company representative.

b) Together they browse through the collection and Helle comments the different garments and answers questions from Elisabeth.

c) Helle takes pictures using her ‘image device’ of the garments Elisabeth is interested in.

d) Helle annotates the pictures with comments regarding prices, colours, etc., using her ‘image editing tablet’.

e) Finally, Helle sends the set of annotated pictures from her ‘image editing tablet’ to her ‘portable printer’, producing a personalized catalogue.

Figure 5. Displaying the collection.

off-the-shelf products. These can act in concert to provide the function of a ‘portable print shop’. The detailed features of each of the separate devices are not critical. The ‘image device’ (i.e. digital camera) and printer only needs resolution high enough to produce print with reasonable quality in A5-format. The function requirements of the ‘editing tablet’ are also simplistic. It should provide possibilities for simple annotations directly in the images. The qualities of use are delivered through the configuration of the
three devices as a ‘portable print shop’ based on the needs of the particular context – the business meeting where Helle presents her collection to a retailer. The mobile ‘portable printshop’ is a further example of how digital information is created in a mobile setting, based on the needs of a particular situation. This creates added value by way of services, for both parties (Helle as well as her retailers).

**Conclusion**

Increased connectivity in mobile technologies, coupled with increased dynamics in user needs, provide new challenges for the design of mobile technology. Our aim with the COMIT-project has been to explore new avenues of inquiry into mobile user’s needs in order to inform the early stages of the design process, with particular emphasis on contextual factors and connectivity. We have combined rapid ethnography with participatory design in an event-driven process where users, designers and researchers have collaborated in developing ideas for mobile technology on a conceptual level. The overall experience gained from the project is that we were able to generate a useful knowledge base that caters for the specific design process, as well as indicators for more general issues on mobility, using relatively little resources. Our short field studies provided a first base for generating concepts and scenarios that were well grounded in the user’s everyday worlds. Bringing the concepts developed back to the user’s context at an early stage without detailing the interaction was an important step in empowering the users. By letting the users themselves create mock-ups with simple materials that were used as props in role playing scenarios on location, proposed concepts were refined and new concepts were rapidly identified and developed with a firm grounding in the user context. For instance, Helle’s ‘portable print shop’ for personalizing a collection catalogue to a retailer was a concept developed during scenario enactment around the image device and image editing tablet. Although our aim was not primarily to search for potential products, the participating companies judged some of the concepts developed as holding valuable information for future product development. Another
outcome of the project was that one of the industrial partners, Sony Ericsson Mobile Communications, has engaged in a project based on the COMIT design approach.

Regarding general issues on mobility indicated in our collaborative inquiry, we find the consequences of being omni-present in multiple social contexts important in designing mobile technology. As designers we should be sensitive to the different social roles of the user in different contexts, as well as how these roles may imply different user needs. In the first two examples above we have tried to identify some issues involved in handling multiplicity in identities, social contexts and devices. This is an area in need of further exploration. Mobile devices has opened new possibilities of information technology use in space and time, and consequently the expectations on peoples’ availability for communication has increased. However, the most important difference is that increased availability means that we co-exist in a multitude of social contexts. Even if location is static, it is the use of mobile technology that opens for our omni-presence in multiple social contexts. This is not to say that the geographical location of the user is irrelevant. That would lead back to the slightly outdated marketing view of the nomadic user as context independent, free to do business anywhere anytime. It is rather about the users’ ability to adapt to the needs of the current situation. Physical location fixates certain contextual factors – it might be a noisy environment, or an area where only low bandwidth communication is available. A greater challenge is to support the user in handling multiple social roles, given the contextual factors of the social situation. Ronny wants to be able to handle communication with his family at any given time. This is characterized by short messages, quick responses and a certain discretion and intimacy while in ordinary business communication. The most important use quality for Ronny revolves around emotional awareness of his family’s well-being and organization of daily arrangements. The scenario from Rickard’s daily work also indicates a need for being available to his closest social network in parallel with being a sales agent. The ‘personal messaging device’ gives a first direction for
possible solutions. However, as already mentioned the concepts developed in this project are not to be seen as potential products, but rather as placeholders for artefacts mirroring relevant aspects of mobile technology and its potential/shortcomings. The main issue requiring further research is how to support fluency in handling multiple social contexts that allow the users to operate in their different roles in daily life while still responding to the dynamic contextual factors of particular situations.

A further observation is that, in the future scenarios created together with the users, we found that the use qualities often emerged from the different devices acting in concert to provide a function, rather than from the basic functionalities in each device. On a conceptual level this implies to us as designers that, rather than focusing entirely on the separate devices, their functions and prospective use qualities, we should direct our attention to what the relevant configurations of a set of devices can deliver to the user. The trend towards information appliances (Norman, 1998) suggest that devices should be task focused while still being able to communicate with other devices. Sherry & Salvador (2002) recognize another trend where increased connectivity via Bluetooth™ and other technologies rather points towards a disarticulation of the elements of computing. Storage, display, software for main functions and other elements are separated in different devices implying a more ‘architectural’ approach to providing services to users. In line with these ideas the last two examples serve to illustrate that use qualities do not necessarily emerge on a device level. Rather, in these scenarios the most important use qualities emerge on the level of a configured set of devices. Arguably, it is the particular device configuration as a response to the needs of a use situation that produces relevant use qualities, suggesting a shift in the design agenda regarding what to design in mobile technologies. This further implies that the designated functions of a device may be defined on a level more loosely connected to specific user activities. The cell phone being re-configured as a remote control referred to in the introduction, may be reframed to be portable keypad supporting wireless
communication with other devices. From this perspective, technology is deliberately open to configuration to further enable the user to manipulate freely the adaption of various devices in any given situation. This implies that the user could be in control of configuring, manipulating and adapting mobile devices to their personal needs.

In conclusion, our exploration of contextual issues in mobile computing has indicated several avenues in need of further research. Regarding multiple social contexts, we need to develop a deeper understanding in how to support users in coping with different social roles as well as the different needs associated with them. Regarding multiple devices and connectivity, our explorations have suggested that important use qualities may emerge from sets of devices configured by the user, rather than single devices. We need to further pursue possibilities in letting users configure devices for particular situations. Finally, a combination of field studies and collaborative design has been a fruitful approach for our inquiry into contextualizing mobile IT.

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