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Rewriting Context and Analysis: Bringing Anthropology into HCI Research

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1. Introduction

The use of technology is not a given; rather, we use tools and technology to interact with each other and/or cooperate with each other in various social contexts. Human-Computer Interaction (HCI) research has for long time emphasized the importance of understanding the social context in which this interaction occurs. The concern for and importance of understanding the social context in system design is often motivated by research on immediate context in which work and system development occurs and/or where a certain technical artefact or a computer is used. Analysis within HCI tends to focus on the ongoing activity, the moment-by-moment action of individual lay actors. These events and actions are given priority and are regarded as significant in part because these can be counted. The focus of the analysis is on the particularities of the immediate situation, thus missing the larger picture of what is going on. These types of studies as they have been carried out in HCI deemphasize the study of more stable phenomena and reproduction of a series of structures that inform individual action. In conclusion, the study of moment-by-moment actions of the technology use provides us with only a partial understanding of the social context.

The role of ethnography, other than as a research methodology, within HCI has been to point out the importance of understanding the social context, the routines of users' workday, its practical management and organization. However, the use of ethnography in HCI-research and particularly in design is not unproblematic as the ongoing discussions about the role of ethnography suggests. For example, designers and developers tend to use ethnography instrumentally as a form of data collection in order to identify and solve problems. Results of ethnographic analyses are expected to feed directly into the interests and issues related to technological development. This misrepresents the role ethnography has in anthropology and in the social sciences, more generally.

The more we know about the socio-cultural and historical circumstances the users live in and act on, the better the chances that we can design technologies that support (or change) the users' everyday work. What we are suggesting here is the need for a more analytical, more inclusive way of understanding technology, its design and implementation. This, we believe, is the contribution anthropology can bring to the field of HCI community. Today in the HCI community anthropology is generally equated with ethnography. This is

unfortunate because anthropology can provide the HCI community with an interpretive agenda, one that can help strengthen traditional HCI research.

We start with an introduction to ethnography then turn to how the social context has been defined in HCI and point towards a more adequate social science approach. Thereafter we will demonstrate what this analytical “turn” can contribute to the study of technology use in the workplace.

2. Ethnography in HCI

Ethnography started to appear in HCI in the 1980's. Ethnography's original role in IT research was critical, drawing attention to the failure of conventional research methods to capture the differing perspectives on the use situation (Crabtree, 2004). It pointed to and stressed the importance of the daily routines of the users' workday, the practical management of organizational contingencies, “the taken-for-granted, shared culture of the working environment, the hurly-burly of social relations in the work place, and the locally specific skills (e.g., the ‘know-how’ and ‘know-what’), required to perform any role or task” (Anderson, 1994: 154). The formal models and methods characteristic of HCI research at the time were found to be “incapable of rendering these dimensions visible, let alone capturing them in the detail required to ensure that systems can take advantage of them” (op. cit. 154). Ethnography was thought to be a method that could access these dimensions.

Ethnography, in its broadest sense, has been useful in several areas within design and system-development projects, such as examining work domain, workplaces, and work practices (e.g. Blomberg et al., 2003; Nardi, 1997; Pycock & Bowers, 1996), capturing the situatedness of specific skills (Normark, 2005), investigating the relationship between technology and work, evaluating the products and software systems i.e. conducting a sanity check on design (Hughes et al., 1994), or even acting as “user's champions” (Bentley et al., 1992: 129) and sometimes functioning as an user's advocate in development and design projects. Technology can also be seen as a vehicle for social research, which emerges through a socio-technical methodology, “technomethodology” (Button & Dourish 1996). The ethnographer's role in IT research, it is suggested, would be to identify researchable topics for design through workplace studies and use them to develop abstract design concepts and work up design-solutions (Crabtree & Rodden, 2002).

However, the use of ethnography in HCI-research and particularly in design is not unproblematic (e.g. Anderson, 1994; Bader & Nyce, 1998; Forsythe, 1999; Nyce & Bader, 2002; Nyce & Löwgren, 1995). Designers and developers tend to use ethnography instrumentally to identify and solve problems. It has been reduced to a realistic strategy, one that collects “things” and “answers” questions. In the design-and-development community, what a “problem” is, almost always takes an instrumental, pragmatic turn. “In particular, what a ‘problem’ is and how to ‘solve’ it get reduced to a series of practical interventions and practical outcomes” (Nyce & Bader, 2002: 35). This again reflects the legacy of ethnography within HCI, where its role is to handle event(s) and action(s) in order to “predict” outcomes. Ethnography here is reduced to a useful method for gathering and specifying end-user requirements in order to inform systems design: “Instead of focusing on its analytic aspects, designers have defined it as form of data collection. They have done this for very good, design-relevant reasons, but designers do not need ethnography to do what they wish to do” (Anderson, 1994: 151).

There is often a gap between accounts from the field and how the “information can be of practical use to system developers” (Schmidt, 2000: 141). Even if designers work closely with users and representatives of ethnography and psychology in a particular setting, “the objectives of the experiment are clearly defined and the technological options identified and bounded in advance” (op. cit. 148). “Traditional” ethnography does not necessarily fit the requirements and working practices of a design project. For example, requirement analysis is reductionist in character, which in some important ways sets it apart from ethnographical analysis (Crabtree & Rodden, 2002). There are differences between an “adequate account” for the purposes of social science and an adequate account for the purposes of design, one which is intended to contribute to the development of a particular set of occupational practices (Crabtree, 2004; Crabtree & Rodden, 2002; Räsänen & Lindquist, 2005; Shapiro, 1994).

Within HCI and related research areas, ethnomethodology (Garfinkel, 1967/2002) has been promoted as the kind of field research approach that is needed in design (Crabtree, 2004). However, the way it was applied in HCI reduced both ethnomethodology and ethnography to a kind of empirical exercise, which lessened the contributions it might have been able to make to the study of man-machine operations (Nyce & Löwgren, 1995). Whatever criticisms one has, ethnography and ethnomethodology in HCI both offered an opportunity to better specify design practice; the results in turn could improve the innovation and invention into the future (Button & Dourish, 1996; Crabtree, 2004; Crabtree & Rodden, 2002).

One strand of ethnography emphasizes interpretation, not discovery, and the analysis of our own practises as well of those of others. The approach is concerned not only with the production of the society, but also with its reproduction as series of structures (Anderson, 1994; Bader & Nyce, 1998; Chalmers, 2004; Dekker & Nyce, 2004; Dourish, 2006; Giddens 1984/2004; Nyce & Bader, 2002). Recently, the idea of informing design, a key idea in HCI, has been questioned. Dourish (2006) criticizes the politics and conditions under which ethnographic work is done in HCI. By “forcing” ethnography to work towards “implication for design,” it misplaces and misconstrues the ethnographic enterprise. In short, the question of how one can get ethnography to *work* and *work well* within systems development has not yet been resolved. Dourish suggests that ethnography (that is, ethnography that goes beyond the “implications for design”) has a critical role to play in system design; it provides models for analyzing settings and what is going on there. In addition, it may also uncover constraints or opportunities, in particular design practices, and therefore help to shape research strategies (Dourish, 2006; see also Räsänen, 2007; Räsänen & Nyce, 2006).

Nevertheless, social scientists such as anthropologists have long been thought to be able to contribute to the articulation of the social context of technology use. It seems appropriate to draw from that experience, especially since the social context is of importance for HCI and Computer Supported Cooperative Work (CSCW) research. When considered as much a form of analysis as a field method, ethnography can raise the question of what social context “means” in general terms and how it should be taken into account in a particular design and development project. In this chapter, we suggest an analytical position that is in line with social science traditions such as social and cultural anthropology. We suggest that this analytic frame can help the HCI community to “make sense” of the use situation. To achieve this however, it will be necessary to look more carefully at how ethnographic research has been communicated to designers/developers. If the translation of ethnographic research findings is to be successful, it may be as much attention has to be paid to knowledge,

information and work requirements of designers and developers as to those who have traditionally been “targets” of ethnographic research in HCI.

3. Social Context in HCI

The interest in the social context within HCI and related research areas such as CSCW is not new. There are several reasons for this. For one, it became obvious that ICT systems fail when insufficient attention is paid to the social context where the technology is used, for example, at work (Hughes et al., 1994). Human activities involve practices and relations that become meaningful and can be understood in a particular situation, setting and context, and these need to be studied and understood (e.g. Ball & Ormerod, 2000; Blomberg et al., 2003; Blomberg et al., 1993; Dourish, 2001; Nardi, 1996; Nyce & Löwgren, 1995; Suchman, 1987/1990). New technical innovations combined with falling costs, sizes, and power requirements have opened possibilities for ICT packaged in a variety of new devices. The technology is now used for working from home, but also for leisure and other purposes (Bødker, 2006). These changes also emphasize the need and importance to understand and pay attention to the notion of context.

Within the multidisciplinary research areas of HCI and CSCW, the different disciplines involved tend to bring in their various understandings of what context means. The way in which the term is defined reflects differences in intellectual history and research paradigms as well as the different disciplinary backgrounds such as computer science, psychology, communication studies, anthropology, and others found in HCI. Some of the starting points for approaching the notion of context reflect these different research areas, focus, and positions such as learning (e.g. Chaiklin & Lave, 1993) and context-aware computing (e.g. Chalmers, 2004; Dey et al., 2001; Dourish, 2001; 2004). The development of several methods and techniques, such as contextual design (Wixon & Holtzblatt 1990), and the use of weak and strong ethnographical methods reflect the need for understanding the context in which users act (e.g. Blomberg et al., 2003; Nyce & Bader 2002; Spinuzzi, 2000).

It is difficult to precisely define the notion of context. It is an ambiguous concept “that keeps to the periphery, and slips away when one attempts to define it” (Dourish, 2004: 29). However, there have been attempts to define the term in order to handle the various needs of HCI research and practice. User’s location, environment, identity, and time specifications when the application is used are aspects found in the early definitions of context (Dey et al., 2001; for one of the earliest attempts to define context within HCI see Schilit & Theimer, 1994). Definitions of context can also be found in guidelines and standards. Standard ISO 13407, for example, defines the “context of use” as “users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used” (ISO 9241-11:1998, definition 3.5). The context of use, it is suggested, should guide early design decisions as well as provide basis for evaluation. The term, context of use, itself draws attention to a specific situation and circumstances where technology is or will be used. Similar attempts to specify context as a term include, for example, usage context, user context, product context, and market context (Moran, 1994).

The notion of context in HCI (particularly in context-aware computing) has dual origins (Dourish, 2001; 2004). It is, first, a technical notion that offers “system developers new ways to conceptualize human action and the relationship between that action and computational systems to support it” (Dourish, 2004: 20). Second, many contemporary HCI and CSCW approaches also rest implicitly or explicitly on divergent social science traditions with

analytic focus on aspects of social settings. The term context is used in the terms of social context, where the work task is performed or the technology used (e.g. Ball & Ormerod, 2000; Blomberg et al., 2003; Blomberg et al., 1993; Hughes et al., 1994). The social oriented perspective focuses on groups of individuals and their interaction and/or cooperation with each other. Various workplace studies combine an interest in technology use and work practices in various fields and work settings covering cooperative work, organizational roles as well as the uses and consequences of information and communication technology in organizations. These include, for example, an ethnographic study of air traffic controllers and how this research was used to inform the technology design (Bentley et al., 1992). Workplace studies vary both in the length of time spent in the field as well as the character of the workplace. See, for example, studies of the London Underground, collaborative work such as in the control rooms (Heath & Luff, 1992) and the operation of a train (Heath et al., 1999), a study of CSCW in a small office (Rouncefield et al., 1995), and a study of the fashion industry (Pycock & Bowers, 1996). These studies draw attention to the social context of technology use, which is also a focus of the present chapter.

3.1 Situated Action

One of the most influential social analyses of social context in HCI research is Suchman's (1987/1990) analysis of social action based on ethnomethodology, an analytic approach to social analysis developed by Garfinkel (1967/2002). Suchman focuses on the practical, everyday, ordinary achievements and actions of members of a particular society. She showed that individual's interaction with technology (in her study, a photocopier) did not follow or obey a formal model, but rather exhibited a moment-by-moment, improvised character. Suchman suggests that "however planned, purposeful actions are inevitably *situated actions*"; they are "[...] taken in the context of particular, concrete circumstances" (Suchman, 1987/1990: viii, emphasis in origin). Her work was a welcome critique and corrective of planned accounts of human social action at the time. Even today, the concern for and importance of understanding the social context in system design is often motivated by research on "situated actions." Suchman's work pointed out and made visible the need to study the social context where the technology is used. Various studies of technology use follow up on this tradition. However, we should keep in mind that Suchman's detailed and careful analytic project was concentrated on the immediate context of technology use. It looks at the situated, moment-by-moment actions between the actors, but also what occurs between the actors and the technology as well as between the actors and their immediate environments. This, we believe has had significant consequences for how social context is understood, what is included, and what is left out of such a studies in HCI.

While holding out the promise of methodological and analytical strength, the analysis of situated action has come to define what constitutes acceptable research and analysis of the context of technology use. These studies, we believe, represent a more or less a win-win situation for HCI research. They point out the importance of situation, agency, and the actor and bring them into the analysis of the social context of technology use. They also have helped legitimize field methodology at large and as research practice in HCI. One reason for the use of the situated action models might be, we suggest, the need to investigate the detailed accounts of everyday practices for design and development purposes, where the focus is, for example, on behaviour, benefits, and evaluation of the artefact and its use. This type of inquiry is often limited by strict, short timelines. Situated action models do not deny

the importance of social relations, knowledge, or values of the community or individual. Nevertheless, analysis within HCI still tends to focus on the ongoing activity, the moment-by-moment action of each lay actor. As such it either neglects or underestimates the influence of other elements present and important in social life (Chalmers, 2004; Nardi, 1996). The focus of the analysis is on the particularities of the immediate situation, thus missing the larger picture of what is going on. It is also argued that these types of studies as they have been carried out in HCI deemphasize the study of more stable and elemental phenomena (Nardi, 1996). They tend to be “[...] concerned with the production of society, [...] but much less with its reproduction as a series of structures” (Chalmers, 2004: 230). In conclusion, the study of moment-by-moment actions of the use of technology can give us only a partial understanding of the social context. However, this approach tends to define how most of us think about the social context within HCI. Analysis of the immediate use context and moment-by-moment actions can be useful for certain purposes. However this does not exhaust the possible ways in which social context can be understood.

3.2 Extending the Approach

A continuing debate within HCI revolves around how to broaden our analysis and approaches to the social context so that they can provide a more comprehensive picture, a broader and/or deeper account of technology use. Chaiklin and Lave (1993) and Dourish (2004), for example, have acknowledged the role that cultural and historical elements play in everyday practice. Dourish (2004) reminds us that there is a link between action and meaning, that these together inform what we mean by context, and that structure, history, and culture, not just individual action, constitute, inform, and influence what context means for those who both participate in and study it. The basis for understanding context lies in not just lived experience but also in the structures and resources that make this possible. Context is more than something that people do. Nor can this be reduced to “embodied practice” or “embodied interaction” (Dourish, 2001; 2004). Nyce and Löwgren (1995) discuss how fundamental categories (such as practice and change) are often taken for granted or assumed to be universal. This can neglect significant cultural as well as historical features. The authors examine the concept of participatory design tradition and point out that it rests on and reflects a Nordic tradition not just of cooperation and collaboration but of language use in the workplace (about the Nordic tradition see e.g. Bødker et al., 2000). Chalmers (2004) also refers to the historical elements of context.

Often the starting point and interest for the social context of technology use in HCI and CSCW is the particular work tasks. Consequently, to focus on other aspects of the work life can be seen as extending (broadening) the approach to the social context. This includes the daily routines and shared culture of the working environment (Anderson, 1994). Orlikowski and Hofman (1997), for example, explain how an existing organizational, team-oriented, cooperative culture allowed the staff to take advantage of the novel groupware technology for knowledge sharing (Lotus Notes). The benefits of the same technology were predicted to be much slower in another organization that rewarded individual performance. There, knowledge sharing via technology was seen as a threat to status and individual competence. This and other similar studies point towards the importance of paying attention to the organizational culture of a workplace. The organizations’ structure and culture influence how, for example, groupware technology is implemented and used.

Moran and Anderson (1990) developed interest in working life beyond task performance by proposing a “Workaday World” paradigm for CSCW design. This paradigm is based on the idea of a life-world, which includes people’s everyday activities, their relationships, knowledge, as well as various resources. The Workaday World paradigm includes technology, sociality, and work practice, suggesting that these aspects are not to be separated, but constitute a dialectic and are together involved in the shaping of a working day. It suggests “the richness of the settings in which technologies live--the complex, unpredictable, multiform relationships that hold among the various aspects of working life” (op. cit. 384). The Workaday World suggests that technology is not central within the working day, but rather has to be put in “proper perspective” (op. cit. 384).

3.3 Unpacking Social Context

The English noun, context, comes from Latin *contextus*, meaning connection of words, coherence, and from *contexere*, to weave together, connect (*The Oxford English Dictionary* 1989 vol. III). Context is defined as “The weaving together of words and sentences,” and “The connexion or coherence between the parts of a discourse” as well as “The whole structure of a connected passage regarded in its bearing upon any of the parts which constitute it: the parts which immediately precede or follow any particular passage or ‘text’ and determine its meaning” (ibid.). Word context also refers to environment and setting. The notion of context implies a combination of two entities: a phenomenon and an environment within which it is embedded (Holy, 1999). Context is described as a frame, an environment, a background, a perspective, or a stage that surrounds a phenomenon or an event and provides resources for its appropriate and meaningful interpretation. What is posited as context in one study may well be the central object of study in another (ibid.).

The notion of context is an important concept in the social sciences, such as anthropology. There it works both explicitly as well as in the background, weaving together with other concepts, approaches, and models of social organizations. As far as we know, there is no single, agreed upon definition of the concept within anthropology. Nevertheless, ever since Malinowski, anthropologists have tried to place and understand social and cultural phenomena in context (Dilley, 1999). However, the notion of context draws attention to both epistemological and methodological problems in social anthropology (ibid.). It is difficult to define precisely the concept of context. Agreement on a single theoretical position or definition of the term context may not even be possible or necessary (Dilley, 1999; Goodwin & Duranti, 1992/1997; Holy, 1999). The aim here is neither to solve the problem of context, nor to propose a new definition. What follows instead is a way of unpacking the idea of the context in order to be able to discuss it (as a “whole”) in relation to technology use. One way to extend the notion of context within HCI, we believe, is to pay attention to what goes on beyond the immediate use of technology itself, i.e. to turn towards the structures and conventions that constitute technology use and vice versa. This would make it possible to analyze the activities within which the use is embedded and through which it becomes meaningful. It is this kind of analysis we would like to argue for here.

We take the practices and routines of the work day as our analytical point of departure in order to start approaching the context of technology use. We pay attention to the day-to-day practices during the everyday encounters. Various technologies are often, but not always, used to help carry out these practices. This way, we hope to be able to approach and address not just the speech acts or the practices and routines of a working day, but also the social

and cultural conventions that provide the “infrastructure” of daily life (Goodwin & Duranti, 1992/1997: 17) through which the daily practice gains its force as a particular kind of action. In other words, we wish to approach context so that recognizable socio-cultural conventions can be used to make sense of the technology use. As Goodwin and Duranti (1992/1997) emphasize, not only are the activity and the material environment of importance here, but also knowledge of the social dimensions that is created and negotiated through historical processes. The term infrastructure implies an idea of a “frame” (Goffman, 1974/1986) that surrounds the event and makes an appropriate interpretation possible. Context then becomes the framework within which a certain activity is embedded. Implicitly, it indicates that the activity is informed by previous history. However, it also suggests an asymmetry between an event and its “background,” which would be somewhat misleading for our purposes here. While it calls attention to the event and the participants, it tends to neglect certain aspects of its surroundings and furthermore, aspects of reproduction. The challenge here is to call at least as much attention to the context as to the event (technology use) itself. The everyday practices we are interested in are, as the word indicates, everyday practices. They can be monotonous and not always reflected upon. The monotony in the practices makes these practices to a certain extent “invisible.” The task here is to make visible not just what is immediate but what informs it—infrastructure, the background, or the environment. It is necessary to replace context as the focus of analysis, although this may sound paradoxical. One has to map the context, not entirely in the sense of situating the phenomena (e.g. technology use) in a context, but in the sense of mapping the context and what makes it appear logical and natural (Daryl Slack, 1996; Dillely, 1999). Articulation is a process of creating connections that can make a unity of (two) different elements under certain conditions (Daryl Slack, 1996). It is a complex, unfinished process that tends to foreground some and background other “theoretical, methodological, epistemological, political and strategic forces, interests and issues” (op. cit. 114). Articulation has to some extent come to stand for contextualization itself (Dillely, 1999). How to map context and these connections as well is the interpretative problem we want to discuss here.

This brings us to a central problem in the social sciences, how in analysis can we connect all the various elements, the “layers” such as event and context, as well as individual and social perspectives? What are the significance (conditions, forces, motives, causes, consequences, and so on) of the relationships between the individuals and society? According to Giddens, perhaps the most important contribution the social sciences can make to intellectual discourse is to rework conceptions of human action, i.e. social reproduction and social transformation (Giddens, 1984/2004). However, “micro” and “macro” levels of analysis are carried out in the social science as separate enterprises. Giddens argues that there is no necessary conflict between the two perspectives: one is not more fundamental than the other. Pitting them against each other implies that one needs to choose between them. This “unhappy division of labour” (op. cit. 139) tends to separate analysis and theoretical standpoints, which Giddens believes is unfortunate. He argues that structuration theory is a solution to this problem.

When Giddens talks about structure, he does not mean those “facts” and features of social life that define what can or cannot be done. Rather, he is concerned with what is internal to individuals. For Giddens, structure is embedded both in memory and in social practices, i.e. those “conditions of social action that are reproduced through social action” (O’Brien, 1998: 12). Social actions (or forms of conduct) are situated in and reproduced through time and

space, both of which are organized independently. According to Giddens, structure is both generative and transformative. It is both the “medium and outcome of the practices they recursively organize” (Giddens, 1984/2004: 27). Everyday life consists of repetitive practices through time-space. The term structuration captures and allows us to understand the routine sense of practices as well as their continuation and justification. While the analysis of day-to-day life is essential to analysis of the reproduction of institutionalized practices, the point of departure for Giddens is the actions of knowledgeable individuals. In other words, “structure” should not in itself be objectified and explained. Rather, human action has to be explicated for social production to be understood. However, everyday activities should not be treated as the “foundation” of social life, but rather “connections should be understood in terms of an interpretation of social and system integration” (op. cit. 282). Next, we will analyse human action and practices at a workplace and make connections to the structures and ideology of that workplace and beyond. As individuals engage in everyday practices, they recreate and help maintain these practices and context itself. This Giddens makes clear helps inform, define and legitimize the culture and society these individuals belong to.

4. Operators and Work on Display

The example that follows suggests how social context might be “expanded” in HCI research. This vignette comes from the first author’s fieldwork in a Swedish call centre workplace, the Police Contact Centre. The Contact Centre is an in-house service within the police authority. The Contact Centre in Stockholm is located on three islands in the archipelago with management and headquarters on mainland. However, the Contact Centre is organized and managed as a single unit. Its primary task is to handle crime reports from the public concerning everyday crimes. The exceptions are ongoing crimes and crimes where perpetrator is known. The police handle these kinds of calls, many of which are made to the emergency telephone number 112 (in Sweden) and are handled by SOS operators. The crime reports handled by the Contact Centre, on the other hand, concern everyday delinquency, such as thefts of mobile phones, wallets and cars, as well as damage and vandalism. At the time of the fieldwork, the service goals at the Contact Centre included, for example, that 90 per cent of all telephone calls must be answered within three minutes. At worst, only 15 percent of all incoming telephone calls, ones with more than a ten second wait time, could go unanswered.

One morning in October 2002, Kerstin was sitting at a work desk next to researcher’s desk. There was a telephone, a computer screen, a keyboard, and a computer mouse on her desk. There was also a notebook, pens, and papers, and a pile of damage reports of graffiti found in buses, underground trains and station areas in Stockholm. That morning Kerstin was assigned to register the reports about graffiti in a police computer application. Kerstin was doing this work one report at a time. There was a display on the telephone. Kerstin looked at the display and commented to herself on the high number of incoming telephone calls as well as the low number of persons logged in to answer them. She looked around the open-plan office and turned back to the damage reports and her computer. Now and again, she glanced at the telephone display. After a while, she put a sheet of paper on the telephone to cover the display and hide the information (the number of operators logged in, the number of incoming calls). Some time went by, and she continued to work on the damage reports. Once again, Kerstin turned to the telephone. She removed the paper and looked at the display. She sighed deeply and looked around the open-plan office. Kerstin covered the

display again and continued to work on the graffiti reports. Now and again, she lifted the sheet of paper and checked the display as she continued to enter her graffiti reports.

We will now attempt to unpack what seems to be going on here. Kerstin's actions, like those of any other actor, need to be understood in relation to time, location and setting. Following Giddens, some questions immediately come to mind. What is the moment-to-moment action here? What can the action tell us about social production? What is the structure and what does it mean to one's informants like Kerstin? Do we need history or culture, two central structural properties, to understand what is going on here? Can we infer (discover) what these are through workplace observation alone? A related question is what kind of discovery procedure, analysis, or interpretive operation, will enable us to make sense of "what's 'really' going on here?" Finally, what can we learn from this example about the design, development and implementation of work technology?

4.1 Situated Practices

The telephone is one of the most used working devices in the Contact Centre. All incoming telephone calls regarding the crime reports from the public are distributed through an automated call distribution system to a free operator regardless of where s/he is. The display on the telephone shows the total number of incoming telephone calls from the public placed in queue to the operators at the Contact Centre. It also shows the number of operators logged in on the call distribution system and ready to receive telephone calls. Login procedure has two main steps. The first command on the telephone activates only the display on the telephone. The display now shows the total number of incoming telephone calls from the general public queuing to be answered. It also shows the total number of operators logged in on the call distribution system at the Contact Centre. The next step is to type in a personal login-code; then the operator is connected to the call distribution system and the system starts handing the operator telephone calls. The display on the telephone shows the most current information on the number of telephone calls as well as the number of operators accepting calls. In a way, it represented information on the workload based on the telephone calls. It also showed how many persons were working with incoming telephone calls at that moment.

When asked, Kerstin explained it was important to keep herself up to date about the workloads of others at the Contact Centre. She did not like to do other work when the number of incoming telephone calls was high. That morning she raised the question about which work really counted. Could filing graffiti reports, she asked, really be more important than answering incoming telephone calls? Later, Kerstin and her fellow staff members explained that the checking the queue had much to do with "responsibility towards the work tasks" and that this helped insure that "the work was done."

At the Contact Centre, Kerstin was not the only person to monitor the display closely even when not expected to do so, for example, while writing or reading e-mails or being engaged in a conversation with someone else. If staff noticed that the number of incoming telephone calls increased, they would start to take telephone calls. When the number of incoming calls is high, it most likely means long waiting times and some degree of irritation for the persons calling. This, in turn, creates a stressful situation for the personnel because callers often start their conversations with complaints about how long they had to wait. For the personnel, it is not pleasant to deal with annoyed people call after call. Nevertheless, there were valid reasons for not being logged in on the call distribution system. One of them, as seen here, is

other work tasks. For a number of reasons, an employee also needed to log out of the call distribution system in order to complete a report for the police. The regular (at that time) five minutes delay set up between the telephone calls was not always enough time for employees to complete this task.

Once an operator logged out, i.e. left the call distribution system, the information regarding him/her, as a number on the display, was no longer available. For Kerstin and her fellow staff members at the same location, this was not a problem; they saw each other anyway and could keep themselves apprised of another person's whereabouts and work efforts. At the other two locations, it was not always clear what was happening with call queuing. Did an operator at a site quit working? Posted, shared information about personnel and working hours did not always answer the questions operators had at a particular moment. Several times personnel wondered what was happening at the other two sites when the number of operators was low. When this happened personnel from one site called another to ask, "What is going on [there]?" Those who received the telephone calls did not appreciate this, which caused some tension among the sites. What underlay, it seemed, these conversations was divergent understandings of work and work responsibilities. This practice of "checking" partly led the notion of "big sister" being coined at the Contact Centre. This did at times indicate the relationship with the site that was, in a way, parenting (supporting) others. While parenting is about caring for and helping those who were new to the Contact Centre, this notion of "big sister" also was a statement about hierarchy, that one site can be seen as somewhat superior to the other two.

Not knowing what was going on at the other sites, especially why the number of logged on operators was sometimes low, was an issue that came up again and again at the Contact Centre. The question was also raised at a semi-annual joint workplace meeting for all the Contact Centre staff. The topic came up when "everyday comfort/well-being, working environment, and ethics" was discussed. This discussion started in small groups and became an issue the group took up as a whole. It became clear that the issue was a sensitive one--one that raised the spectre of control and surveillance. Staff believed that the checking on each other across the sites was not appropriate. The staff concluded, "We must trust each other." They also raised a number of related work issues. The five minutes delay between the telephone calls, the staff argued, is sometimes too short for finishing up a report before the next call arrives. The telephone display, personnel added, did not always show accurate information. This points to an issue of trust and truthfulness in relationship to technology - an issue the HCI literature has not systematically explored yet. The telephone is an important tool in the Contact Centre, not only for making and receiving telephone calls. The numbers on the telephone display represent current information about the workload ahead. This information and the way it was interpreted became a kind of thermometer that said much about the climate at the workplace. The telephone became an instrument staff used to plan, make sense of, and prioritize work. Keeping an eye on the telephone display or, rather, the queue information there, was, in a way, keeping an eye on the number of general public calling in, taking action so as not to make them wait. Not making them wait is part of the service the authority wants to give the public. It is also an action to protect the Contact Centre staff from people who become irritated when they had to wait too long. It was also used for checking on, interrogating, and monitoring each other. While checking on someone has a somewhat positive meaning in this context, issues related to accountability and surveillance were there too, and not far beneath the surface. The telephone display allowed

the staff to monitor each other without revealing that they actually were doing this. How an individual assessed a particular situation varied according to his/her previous understandings and his/her perception of “work load” at that particular time and place. Among Contact Centre employees, these were important, unresolved issues. They came up in discussions at a joint workplace meeting, one with a tight time schedule and agenda. This shows how important these issues were at the time.

In Contact Centre, face-to-face encounters are not always possible because of diverse work tasks, different working hours and/or geographical distances. Under such conditions, mediated interaction and mediated communication between staff become important. In every workplace, employees create ways of finding out what is going on, who is doing what, and how to indicate belonging to the same organization. When face-to-face interaction was not possible various signs—meeting minutes, Christmas cards, electronic mail, duty schedules and other indicators—constituted intermediary links across the three sites. The presence of others as well as a sense of a common workplace was distributed and communicated by low-tech and high-tech artefacts. Sending employee pictures of one other is also a way to introduce and remind staff of the existence of other personnel.

“Out of sight, out of mind” (*Syns du inte, finns du inte*) was flashed on an electronic outdoor advertisement board at in Stockholm a few years ago. The text advertised the advertisement board itself, high up on a house wall, perfectly placed for road traffic on its way in to the city. However, even small indications such as numbers on a telephone display can help us orientate ourselves in everyday life. The personnel at the Contact Centre need and create possibilities for checking on, monitoring, and supervising their working situation of which they are a part. The problem the telephone display raised for the Contact Centre employees was that their work, all their work, was made visible. In effect, their work could never be out of sight, out of mind. As a result, work, especially the work of others, could not only be inventoried. It could be assessed, questioned and challenged as well. In open-plan office, these issues, especially how to balance control and trust, are complex enough even when one can look around the office and check on the people there. They are compounded at the Contact Centre because both work and responsibility is divided between four geographically distributed sites. Contact Centre staff used their telephone displays to take the temperature not just of their own particular work environment, but also of all those they collaborate with. Given the distance and geography, sense making required even more complicated interpretative procedures than that at most workplaces. To work successfully in and across three different workplaces suggests staff had to negotiate a very complex social context.

Not all personnel experience, of course the same thing. We may react to the same information on the telephone display differently. However, workplace representations and artefacts do not necessarily include everything that is needed in order to understand any one specific action. In order to understand for example what appears on the telephone display, it is necessary to come to an understanding of how different signs and meanings have become embedded in a working day and what these signs mean. Here both use of technology and meaning are iterative. Prior use and experience feeds into the interpretations of subsequent activity, which in turn informs and affects use again. This can take artefact, use and the meaning of them both in different directions. For this reason, it is not enough to treat these elements instrumentally and sequentially. Nor is it sufficient to be content analytically with unpacking the semantic “load” they carry and acquire only in direct

reference to the work itself. If we confine ourselves to this, we would miss a whole series of situated notions that we also need to unpack if we are to understand in any adequate way what is going on in work at any one site.

4.2 Work Domain to Socio-structural Context

The numbers on the telephone display lead us to the institutionalized practices of a call-centre organization. In line with the idea that (monotonous) tasks can be quantified and that efficiency aspects can easily be identified, it is common to collect statistics about work tasks in call centres. The telephone and computer technologies that are used to handle work tasks make these measurements possible (Callaghan & Thompson, 2001; Lindegren & Sederblad, 2004). With help of ICT, there are several technical possibilities management could use to follow up work tasks and to monitor staff members. The use of statistics is also common within the police authority. The degree of criminality in our society, the success of the police authority, and so on is measured, for instance, by the number of reported and resolved crimes. The ICT systems at the Contact Centre that are used to store information about criminality in Sweden can also be used to measure the work performance, a well known fact for Kerstin and others who work there. To find such a direct link between technology, crime statistics and workplace surveillance would not have surprised Foucault.

One informant described the work in the early days of Contact Centre like this; “We are very anxious about our work. We needed to fight for the work opportunities on this island.” Work at the Contact Centre was often described as a kind of struggle. The Stockholm archipelago is in many ways a rural area despite its proximity to Stockholm. As such, issues like access to school and work opportunities are important for those who live there. The Contact Centre organization was established in a rural area by process best described as “push” and “pull.” The establishment of the Contact Centre is a result of a labour-market project to create work opportunities in the archipelago. It is a joint effort between various actors and islanders who were interested in maintaining and creating new work opportunities in the archipelago. The Contact Centre also represents a form of work redistribution to which HCI researchers have not yet paid much attention. The Contact Centre represents a kind of relocation, a movement of capital, infrastructure, and, in a way, labour quite literally “off shore.” The decision to locate this work in the archipelago as well recapitulates a long prior history of connections and businesses between the islands and the Stockholm region.

Work at the Contact Centre was taken even more “seriously” because of the need to draw new work opportunities to the archipelago and keep them there. Staff wanted to show that they were “capable” and “worked hard” to prove their worth to their employer. Some Contact Centre employees were themselves involved in the starting the Contact Centre and now worked there. This work opportunity seems to have been turned into a collective matter in the archipelago and thus become everyone’s responsibility. What you fight for, you also want to preserve. Not only was there a need to bring new economic opportunities to the archipelago, but staff also believed they had to work hard to keep their jobs there. As a result, work issues were framed, not just as monitoring issues, but as issues about collective and individual (moral) responsibility. Given this, it is no wonder that the staff studied their telephone displays so carefully.

Establishment of Contact Centre can also be seen as an attempt to maintain a “living archipelago” (*levande skärgård*). The concept of a living archipelago is one often used today

both on and off the archipelago. While to some extent this idealizes archipelago life and society, it also represents the modern Swedish state's commitment to improving living conditions there. Normatively, the state's intention here is to protect and preserve the archipelago's natural environment and culture. The state's commitment to a living archipelago reflects some kind of a conclusion of a long historical debate on the significance of the archipelago in Sweden. This is no longer so much a debate about a nation's boundaries or regions as it is one about how both the destiny and history of a particular locality is to be defined and negotiated within the nation. Nevertheless, the archipelago has long played an important role in negotiations about place and power in the history of Sweden. This is a debate that essentially revolves around the constitution of national and regional governments in Sweden and ultimately what determines "the order of things."

What is at work here are just the kinds of historical, socio-structural processes HCI researchers have not yet acknowledged as important nor paid much attention to. Nevertheless they have profoundly influenced work and work conditions in the archipelago at a number of levels. As we have argued, social context is not neutral. In the archipelago it reflects a series of recurring social, historical and ongoing political processes. In this way, different forms of social conduct are reproduced continuously across time and space. It would be unwise to neglect these "larger" issues, these other "layers," structures and strictures in our analyses if we wish to understand the circumstances in which our informants live and work. Further, knowledge of this order of things enables what Giddens terms mutual understanding - the epistemological basis he tells us is necessary to carry out any adequate interpretive work in the social sciences. This "know-how" while embedded in and informed by history, including that of the workplace, informants cannot directly report to us.

5. Conclusions

Is it enough to be aware of that conventions and norms that inform the hurly-burly of the organizational culture? Or do we also have to understand and interpret events that extend beyond the particular social reality we are interested in. It is one thing to acknowledge that to study events beyond a certain scale is "hard to do." However, do we really want to "stop" argument and interpretation at this point just because events are, as the HCI literature often puts it, "hard to capture"? The question is, if we "stop" here, do we without realizing it, weaken both the kind of science we can do in HCI and the kinds of practical advice we can give designers and developers?

Social science such as anthropology gives us ways to extend our analysis of technology use. In particular, what comes into view are the different layers, webs, aspects, and perspectives that inform everyday life. The same is true for those resources and structures which underlie and help determine what in everyday life is taken to be "true", "logical" and "natural." This would strengthen the understanding of action that is already the focus of (ethnographic) HCI research. By looking beyond artefact use and the artefact itself we would be able to link artefact to agency and structure. This would help HCI bridge the gap between actor and socio-structural points of views. This offers a way to understand elements and relationships that so far are either under reported or not well analysed in the HCI literature. Anthropology can provide us with the analytic terminology we need to start talking about key issues, a terminology that links individual practice to the socio-structural context in which they occur.

This would provide an opportunity to extend those objects and domains that today define HCI research. Borrowing from anthropology, would help us avoid the temptation to reify or empiricize social action. A more productive line of attack would be to try to explicate the social (re)production of action especially as this pertains to work and artefact. If the HCI community would like to strengthen the kinds of research it carries out, HCI should, we believe, extend its analytical toolbox in these directions. To make this “toolkit” suitable for the HCI, more work is required.

To mistake interaction for context, as HCI research often does, turns attention all too quickly to the individual and individual actions. This encourages us to write accounts of failure and success that implicate only individual actors. To correct for this individualistic fallacy, we need to move beyond immediate situation (workplace, organization) to the analysis of those “larger” historical, socio-structural processes and discourses which both individuals and technology participate in and are shaped by. Further, the more we can learn about the socio-structural and historical circumstances users live in and act on, the better are the chances that we can design technologies that actually support the users' everyday work. What we are arguing for here is the need for a more analytical, more inclusive way of understanding technology, its design and implementation. This, we believe, would be the contribution anthropology can bring to the HCI community.

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