The Human–Computer Interaction Handbook

Fundamentals, Evolving Technologies, and Emerging Applications

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AN ETHNOGRAPHIC APPROACH TO DESIGN

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INTRODUCTION

In recent years, academic and professional researchers and designers working in the field of Human-Computer Interaction (HCI) have looked to ethnography to provide a perspective on relations between humans and the artifacts and solutions they design and use.[1] Within the field of HCI there are different views among researchers and practitioners on just what constitutes an ethnographic inquiry. For some, *ethnography* is simply a fashionable term for any form of qualitative research. For others it is less about method and more about the lens through which human activities are viewed. In this chapter we will attempt to position the ethnographic approach within historical and contemporary contexts, outline its guiding principles, detail the primary methods and techniques used in ethnographically informed design practice, and provide case examples of ethnography in action.

This chapter provides an introduction to ethnography, primarily as it relates to studies in HCI. We will touch only briefly on some of the more controversial topics current within the field of ethnographic research that have enlivened mainstream academic discourse in recent years. We will point the reader to books and articles where these topics are discussed in more detail. Our primary aims in this chapter are to provide academics and professionals in the field of HCI with a working understanding of ethnography, an appreciation for its value in designing new technologies and practices, and a discerning eye when it comes to reviewing and evaluating ethnographically informed design studies.

THE RELEVANCE OF ETHNOGRAPHY FOR DESIGN

The turn to ethnography as a resource for design can be traced back to the early 1980s when computer technologies were moving out of the research labs and engineering environments and into mainstream office settings, call centers, manufacturing floors, and educational institutions. There was the realization that the designers and developers of these technologies could no longer rely exclusively on their own experiences as a guide for the user requirements of these new systems.Instead, designers and developers needed a way to gain an understanding of the everyday realities of people working within these diverse settings (Blomberg, Giacomi, Mosher, & Swenton-Wall, 1991). In many organizations, market research groups were being asked to provide perspectives on the people and practices that made up these varied settings. However, the techniques most commonly used by market research groups at the time (e.g., attitude surveys, focus groups, telephone interviews, etc.) were not well suited for developing an actionable understanding of what people actually do day-to-day that could inform the design of new products and interactive solutions.

Anthropologists and other social scientists had long recognized that what people say and what they do can vary significantly, making reliance on surveys, focus groups, and telephone interviews insufficient for the task. Designers and developers needed a way to get a firsthand view of the on the ground realities—the "here and now"—of everyday life in these diverse settings. At this time in the early 1980s, social scientists working at the Xerox Palo Alto Research Center were beginning to explore ways of bringing insights from ethnographic research into a productive relationship with the design of new technologies (e.g., Blomberg, 1987, 1988, 1995; Suchman,1983; Suchman et al., 1999). Not long after, other research labs (e.g., Hewlett-Packard, Apple Computer, and NYNEX) followed suit (e.g., Nardi & Miller, 1990; Sachs, 1995). Today many industrial research and development labs in the United States have anthropologists and other social scientists with ethnographic expertise on staff (e.g., IBM, Intel, Kodak, Microsoft, Motorola, General Motors, and Xerox, to name but a few).

Ethnographically informed design practices also began to take hold in design firms and consulting companies during the early 1990s (e.g., IDEO, Fitch, and the Doblin group). These early explorations culminated in 1993 with the founding of E-Lab, a research-and-design company that distinguished itself from other design firms at the time by creating an equal partnership between research and design (Wasson, 2000). Ethnographic methods were at the center of E-Lab's research approach, with a commitment to base design recommendations on insights from ethnographic research (Robinson, 1994).

Furthermore, in the mid-1980s the growth in networked applications and devices, made possible through the availability of local area networks (LANs) and early Internet implementations, created awareness among designers and developers that they would need to focus beyond the support of single, isolated users interacting with information technologies. What would be needed was a way of exploring the information and communication practices of people interacting with one another, both face-to-face and through mediating technologies. Information technologies were increasingly becoming communication-and-collaboration technologies that consequently demanded an examination of social interaction across time and space. In response, a group of computer scientists, human-factors engineers, and social scientists, somewhat dissatisfied with the dominant perspectives within HCI at the time[2] founded the field of Computer Supported Cooperative Work (CSCW) (e.g., Grief, 1988; Schmidt & Bannon, 1992.). A group of sociologists at Lancaster University and researchers at the Xerox Research Center in Cambridge, England played a prominent role in helping to shape the ethnographic research agenda within CSCW (e.g., Bentley et al., 1992; Hughes,

[1]Ethnographic research is often just one of many approaches used to inform design. Usability studies, surveys, business case analysis, scenario planning, future workshops and social network analysis are a few of the approaches that are used in conjunctions with ethnography.

[2]The dominant perspectives at the time emphasized technological possibilities over the uses and users of technology, the interface requirements of standalone applications over networked devices, and human psychology and cognition over social interaction. However, by the late 1990s ethnographically informed design attained a prominent place in HCI research and today there is considerable overlap between the fields of CSCW and HCI.

Randall & Shapiro, 1993; Rodden & Anderson 1994; Hughes, Rodden, & Anderson, 1995).

Finally, the explosion of the Internet in the late 1990s accelerated the move of information technologies out of the workplace and into homes, recreational environments and other non-work-related settings. This has redoubled interest in the ethnographic perspective as a valuable tool in the design of new technologies and technology mediated services. This has presented a new set of challenges for designers as they were asked to design and build applications that leveraged powerful, digital technologies for use by people of all ages, engaged in myriad nonwork related activities in diverse contexts. Although the clamor for all that is the Internet has somewhat subsided, the legacy of that period is that researchers and designers who learned their craft during the Internet boom years have gone on to positions in academia and industry, in both boutique design firms and major companies, and in a variety of industries including advertising, marketing, product development, and IT services. In late 2005 many in the ethnographic design community assembled at an industry sponsored conference, EPIC (Ethnographic Praxis in Industry Conference). The conference brought together a diverse group of researchers working in areas such as product design, workplace studies, business ethnography to define the scope of a collective agenda and to strengthen professional ties and research connections (Anderson & Lovejoy, 2005). This conference was a powerful testament to the continuing value of focusing on people's everyday realities and experiences—the here and now—when designing innovative technologies, experiences, and services.

THE ROOTS OF ETHNOGRAPHY

Ethnography has its historical roots in anthropology, but today is an approach found in most all of the traditional and applied social sciences, and in interdisciplinary fields such as Human-Computer Interaction and Human Factors Engineering. In anthropology, ethnography developed as way to explore the everyday realities of people living in small-scale, nonWestern societies and to make understandings of those realities available to others. The approach relied on the ability of all humans to figure out what's going on through participation in social life. The techniques of ethnography bear a close resemblance to the routine ways people make sense of the world in everyday life (e.g., by observing what others do, participating in activities, and talking with others). The research techniques and strategies of ethnography developed and evolved over the years to provide ways for the ethnographer to "be present" for the mundane, the exceptional, and the extraordinary events in people's lives.

Over the years within the field of anthropology both the focus on nonWestern peoples and the implicit assumptions made about non-Western societies (e.g., that they are bounded, closed, and somewhat static) have changed. Today, the ethnographic approach is not limited to investigations of small-scale societies, but instead is applied to the study of people and social groups in specific settings within large industrialized societies, such as workplaces, senior centers, and schools, and specific activities such as leisure travel, financial investing, teaching, and energy consumption to name but a few. Consequently, new techniques and perspectives have been developed and incorporated into anthropology and ethnographic inquiry. However, a few basic principles discussed later have continued to inform and guide ethnographic practice.

PRINCIPLES OF ETHNOGRAPHY

Natural Settings

Ethnography is anchored in the underlying assumption that to gain an understanding of a world you know little about you must encounter it firsthand. As such, ethnographic studies always include gathering information in the settings in which the activities of interest normally occur. This does not mean that ethnographic studies never involve techniques that remove people from those everyday settings or that introduce artifacts or activities that would not be present otherwise. The insistence on studying activities in their everyday settings is motivated by the recognition that people have only a limited ability to describe what they do and how they do it without access to the social and material aspects of their environments. Furthermore, the ability to fully articulate what we do is limited due to the tacit nature of the principles that guide our actions (Polanyi, 1966). Finally, some aspects of people's experiences can only be studied by observing and recording the ongoing flow of activities as they occur (e.g., people's patterned movements through settings such as retail stores or airports, moment-by-moment shifts in scheduling, etc.).

Holistic

Related to the emphasis on natural settings is the view that activities must be understood within the larger context in which they occur. Historically within anthropology the notion of holism focused attention on the fact that societies were more than the sum of their parts (however these parts were specified). The particular aspects of a society (e.g., the court system) could only be understood in relation to the other aspects of the society (e.g., kinship system, belief systems). Today, because ethnography is less often applied to the study of entire societies, the notion of holism has a somewhat different emphasis. Holism holds that studying an activity in isolation, without reference to the other activities with which it is connected in time and space, provides only a limited and potentially misleading understanding of that activity. So, for example, it would be of dubious value to investigate online search strategies without understanding how these strategies fit into the larger set of activities in which search is but one component (e.g., in the context of online trading, shopping, or report writing).

Descriptive

Ethnographic accounts have always provided a descriptive understanding of people's everyday activities. Ethnographers are

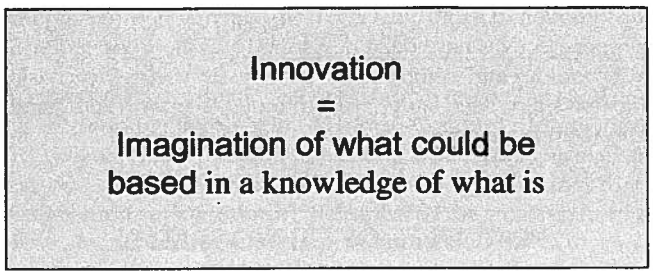

FIGURE 50.1. Innovation.

concerned first and foremost with understanding events and activities as they occur, without evaluating the efficacy of people's everyday practices. This is not to say that ethnographic accounts cannot or should not be used to suggest how things could be different or to point out inequities in current ways of doing things. Indeed, as applied in the domain of human-computer interaction, ethnography is often aimed at identifying opportunities for enhancing experiences. However, there is a strong conviction that to suggest changes or to evaluate a situation, one first needs to understand it as it is. The work practice and technology group at the Xerox PARC developed a slogan to express this conviction that innovation requires an understanding of the present (Fig. 50.1).

As such, ethnographic accounts strive first and foremost to provide descriptive and not prescriptive understandings of people's everyday lives. In recent years there have been many challenges to the idea that a purely descriptive understanding is possible. Critics point out that every account is shaped by the perspective of the researcher, the goals of the project, and the dynamics of the relationship between the investigator and those studied, to name but a few factors that shape ethnographic accounts. While it is hard to argue with this position, in our view the value of ethnography for design is not diminished by the recognition that our accounts are always located and partial.

Members' Point of View

As already alluded to, ethnographers are interested in gaining an insider's view of a situation. They want to see the world from the perspective of the people studied and describe behaviors in terms relevant and meaningful to the study participants. As such, ethnographers are interested in the ways people categorize their world and in the specific language people use to talk about things. This perspective is sometimes at odds with the requirements of quantitative survey research in which the relevant categories must be known in advance of the study and in which the categories and the language used cannot vary across participant groups. In such a quantitative categorical approach, the terms and categories used are likely to be those of the research community and not those of the study participants, which can undermine the validity of the results (see the section on ethnographic methods for further discussion of this topic).

THE POSTMODERN INFLECTION

The scientific paradigm within which ethnography evolved has come under serious questioning over the last quarter-century as social studies of science have shown how scientific knowledge production is shaped by the larger social context in which scientific inquiries take place (Latour, 1987; Latour & Woolgar, 1986; Pickering, 1980). As part of this critical discourse, ethnographic accounts have been challenged for their veracity. Likewise the authority of the ethnographic voice has been questioned (Clifford, 1988; Clifford & Marcus, 1986, Marcus & Fischer, 1986). These challenges have come from a number of fronts, most significantly from study participants who increasingly are able to read ethnographic accounts (Said, 1978) and from feminists who saw in many ethnographic accounts a Western, male bias (Harding, 1986; Smith, 1987; Wolf, 1992; Yanagisako & Delaney, 1995). These challenges have made researchers from all fields of inquiry more aware of how their research is shaped by the particular time and place in which it occurs. It is our view that knowledge of the world is always mediated by presuppositions, be they cultural, theoretical, or practical, and as such no ethnographic account is value-free. But we also contend that this does not diminish the value and efficacy of an ethnographic approach as a resource for designing new technologies, experiences, and services. Maintaining the illusion of a theoretically neutral and value-free absolute "truth" is not necessary to establish the efficacy of ethnographic research in design. By striving to describe and understand how people operate in and construe their everyday "realities," ethnography can provide useful frameworks and roadmaps to guide the design of "people-centered" solutions.

ETHICAL ISSUES

As will be discussed in more detail later, ethnographic research requires developing the trust and participation of the people studied. Without this trust participants will be reluctant to allow researchers into their homes, boardrooms, and classrooms, and they will not openly share their everyday experiences and concerns. Anthropologists have long realized that such a privileged, trusted position requires reciprocity—if you allow me access to your world, I will protect your interests. This bargain has not always been easy for ethnographers to keep. Over the years there have been examples of ethnographic research, where, wittingly or not, the situation of the people studied has been compromised.[3]

In the context in which ethnographic research is being used to inform the design of new technologies—technologies that

[3]To mitigate such negative impacts the American Anthropological Association has developed a code of ethics that provides guidance for people engaged in ethnographic research. This code outlines the appropriate disclosures and protections that should be given to study participants. (Fluehr-Lobban (1991) provides a discussion of ethical issues in anthropological research.)

will change people's lives—it is critical that the ethnographer reflect on the impact this research could have on study participants. Of course, it is not possible to control all the ways findings from ethnographic research will be used, nor how technologies informed by these studies will be integrated into people's lives. But the ethnographer can work to protect study participants from immediate harm (e.g., that caused by divulging a worker's identity to management) and can inform study participants of possible longer-term negative impacts (e.g., job losses brought about by introduction of new technologies). As ethnographic research has moved into new contexts (e.g., HCI, organizational development), it has been necessary to think creatively about how our ethical guidelines map to these new conditions. However, we cannot lose sight of the importance of protecting the interests of those who have agreed to participate in our studies be they workers in organizations, traders on Wall Street, or mothers of special needs children.

ETHNOGRAPHIC METHODS

The ethnographic method is not simply a toolbox of techniques, but a way of looking at a problem, a "theoretically informed practice" (Comaroff & Comaroff, 1992, quoted in Agar, 1996:7). The methods and techniques outlined later in this chapter have been developed over the years to enable the development of a descriptive and holistic view of activities as they occur in their everyday setting from the point of view of study participants. We are not attempting to be exhaustive in our presentation, nor do we want to suggest that there is a fixed set of canonical ethnographic methods and techniques. We encourage researchers to continue developing new techniques as the circumstances require (e.g., studying "virtual" communities, globally distributed work groups, technologically mediated interactions). What we believe remains constant in the ethnographic approach is a commitment to describe the everyday experiences of people as they occur.

Research Planning

One of the keys to a successful research project is the creation of a plan of action to guide the research and support changes and adjustments that inevitably must be made as the project proceeds. Research planning can be divided into three general stages: formulating research objectives, devising a strategy for selecting study participants, and selecting appropriate research techniques and approaches.

Research objectives follow from the specific questions to be addressed by the research. It can be useful to develop an explicit statement that clearly articulates the objectives of a given study. This statement acts as a beacon to help keep the research on track through the many twists and turns of a project. For example, if the research aims to inform the development of a software application that will help doctors manage patients' records, the research statement could be something as simple as "understand how doctors manage patient records through all the phases of treatment and in the varied settings in which they practice medicine." Over the course of a project, the research objectives statement (along with the research design and plan) may change as a project team coalesces and learns about the experiences of the people in the particular domain of interest.

Study Participants

Once the research objectives have been identified, a strategy for selecting study participants (sometimes referred to as a "sampling strategy") is devised that answers two primary questions: what types of participants best suit the research objectives, and how many participants should be included in the study to achieve the research objectives? The strategy for selecting study participants is influenced by the research focus (e.g., shopping behavior vs. work-group collaboration) and may include selecting at different levels of abstraction (e.g., which organizations, which workgroups, and which individual employees). In addition, as Cohen (2005) has cautioned, we should be attentive in making these choices for those who we intentionally or inadvertently excluded from our studies and as such are rendered invisible to our research lens.

Several types of sampling strategies are employed by social science researchers, which fall under two main categories: probability and nonprobability (Bernard, 1995).[4] Our focus in this chapter is on nonprobability sampling, as that is the most commonly employed in ethnographic research.[5] The nature of ethnographic work, as well as recruiting constraints often demand selecting participants based on criteria other than a strict probability.

Four types of sampling fall under the rubric of nonprobability: quota, purposive, convenience, and snowball (Bernard, 1995). When sampling by quota, the researcher specifies which groups are of interest (e.g., women, teenagers, truck drivers, people who use software X, organizations with fewer than 100 employees, etc.) and how many will be needed in each group. The number of groups chosen will depend on the research objectives and the amount of time available, but the basic idea is to cover the range of possible variation one would expect across the target population. Practically speaking, when identifying the variables or factors that should be considered in sampling to enable visibility into possible variations in experiences and practices,

[4]The intent behind probability sampling, or statistical sampling, is to generalize from the research sample to a larger population with a specified degree of accuracy, measured in terms of probability. All types of probability sampling require a randomly selected and relatively large sample size.

[5]Using non-probability samples does not mean we cannot make general statements. If participants are chosen carefully, one can obtain reliable data with as few as four or five participants (Nielson & Landauer 1993, Romney et al., 1987). Additionally, a recent case study demonstrates that smaller, non-randomly selected samples can produce the same results as large-scale survey research for as little as 1/100 of the cost (Green, 2001). A nonprobability strategy also does not preclude conducting a statistical analysis or measuring differences between individuals or groups using nonparametric statistics, such as Fisher's Exact Test or nonparametric correlation measures. Their limitation is that they cannot be used to make claims about larger user populations within a specified degree of probability.

the ethnographer will often presumptively identify "differences that may make a difference" in the experiential domain of inquiry. For example, if the focus is on how people think about and manage their personal finances, the researcher might deliberately strive to specifically sample people with varied financial situations in addition to life/career stages or family situations. To ensure the desired variability is covered—particularly when the researcher is dependent on others to provide access to or recruit the participants for a study—it is useful to create a "screener",[6] a questionnaire-like instrument designed to identify characteristics that are appropriate for a given project. Quota sampling is only possible when the desired participants[7] are easy to identify in advance and recruit. If it is not possible or desirable to specify how many participants will be in each sampled group, a purposive sampling strategy may be called for. This sampling strategy is based on the same principles as quota sampling, but the number of participants for each group is not specified.

Convenience and snowball sampling rely on a "sample as you go" strategy. This is required in situations in which you don't know in advance who will be available to participate or which individuals or groups should participate. Convenience sampling entails selecting people who are available, meet the requirements of the research, and are willing to participate. One might use this strategy, for example, to observe and interview people as they shop in a grocery store.

Snowball sampling relies on participants referring others whom they think would be good candidates for the research, or on researchers identifying individuals or groups to be in included in the study as the research proceeds. Because this method utilizes existing social networks it is especially valuable when desired participants are initially inaccessible or reluctant to participate (e.g., CEO's, drug users, club members) or when the relevant population cannot be known in advance.[8]

Gaining Access

One of the challenges for ethnographic research is gaining access to field sites and study participants. Access to institutional settings often requires getting permission from management to observe and interview employees, or from school officials and parents to spend time in classrooms. In some cases, written permission that specifies certain terms and conditions (e.g., how confidential information will be protected) is required before researchers are allowed onsite. In other cases, recruiting agencies may be used to identify participants and financial incentives may be offered for participating in the study. The time (and skill) required to establish these initial relationships and agreements should not be underestimated.[9]

Observation

As discussed earlier, ethnographers are interested in understanding human behavior in the contexts in which it naturally occurs, making observation one of the hallmark methods of the approach. In academic settings, it has been common for anthropologists to spend a full year at a given field site. While this continues to be the case for more traditional ethnographic studies, shifts in research focus (e.g., away from studies of entire societies), and in study locations (e.g., away from isolated, hard to reach settings) have resulted in more varied research designs which may involve shorter, intermittent fieldwork periods in one or more distributed locations. Moreover, in some applied settings (e.g., enterprise work environments) the time available for field observation may be constrained, sometimes allowing for no more than a few days in any one setting.

WHY OBSERVE?

One of the fundamental axioms in the social sciences, and anthropology in particular, is that what people say they do and what they actually do are frequently quite different. Studies have shown verbal reports to be inconsistent with observed behavior in a number of areas, including (among many other examples) shopping behavior (Rathje & Murphy, 1991), child rearing (Whiting & Whiting, 1970), recycling (Corral-Verduga, 1997), and health habits (Rich, Lamolu, Amory, & Schneider, 2000).

The discrepancies between verbal reports and behavior can be due to a variety of factors. People may be concerned with their image and so report, consciously or not, behavior that is more socially acceptable. Along these same lines, participants may respond to questions in a particular way in an attempt to please the researcher. Another source of disparity between behavior and verbal reports is that people are often not aware of their actual behavior because it is so habitual. Such tacit knowledge is often not easily accessible through interview techniques alone (D'Andrade, 1995).

The limitation of human memory is another reason why interview data can differ from observations. When asking participants about past events, or recurring patterns of behavior, our memory may be selective and skew responses in any number of directions, sometimes in predictable patterns (Bernard, 1995).

The complexity of social life is another reason individual accounts of an event may miss certain relevant details. The environments in which humans interact are extremely dynamic and complex—composed of social relationships, artifacts, and physical spaces—can make it difficult for individuals to fully envision, let alone articulate after the fact, what is going on.

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[6]Screeners are an essential tool if using an external recruiting agency to locate study participants.

[7]For sampling purposes participants need not be individuals, but could be families, households, work groups or other naturally occurring entities.

[8]Johnson (1990) provides a more detailed discussion of sampling in ethnography.

[9]Anthropologists have been accused in the past of only studying the disempowered and disenfranchised because these individuals were less likely to feel powerful enough to refuse participation in ethnographic studies. Although important in all contexts, when studying people with more power and ability to say no (Nader, 1974), it is often necessary to demonstrate how their participation will be of benefit to them, their community or workplace, or the wider society.

THE RESEARCHER'S OBSERVATIONAL ROLE

When it comes to observation, there are varying degrees to which the researcher can become integrated into the scene. At one end of the spectrum the researcher may become an *observer-participant*. In this role, one attempts to be as unobtrusive as possible, quietly observing events from a discreet, yet strategic, position. At the other end of the spectrum is the *participant-observer*. In this situation, the researcher is actively involved in the events observed (e.g., a researcher who goes through the training to be a machine operator in an industrial environment).

There are pros and cons associated with each type of role. While being fully integrated into the action provides a researcher with firsthand experience of an event, taking good notes in this context is difficult at best. A great deal of energy is spent trying to fit in rather than on attempting to make sense of the events in the context of the research objectives. In such cases, one must rely on memory of the events when writing up field notes after the fact. Taking a more observational role affords a wider perspective on events and the time to record and reflect on events as they unfold. On the downside, it precludes the opportunity to experience the activity firsthand. In many research situations, the ethnographer's position moves between these two extremes, sometimes occupying a hybrid position of both partial participant and outside observer.

STRUCTURING FIELD OBSERVATIONS

Before setting out to observe, decisions need to be made about what, where and when to observe (Whiting & Whiting, 1970). One might decide to observe individuals as they go about their work and daily routines (person focused), a technique sometimes referred to as "shadowing" (Wasson, 2000). The researcher might also decide to focus on a specific event, such as a meeting or software education class (event focused), or observe the activities that occur over time in a given area, like an office or store (place focused). One can even shift the subject of observation to an artifact, such as a document, and record its transformation as it moves from person to person or along a development path (object focused).

VIDEOTAPING

Given the complexity of human behavior it is impossible to notice and record in real time everything of interest to the researcher. This is one reason video cameras have become increasingly popular in fieldwork. Video records can be used as a reference to supplement field notes. The ethnographer also has the advantage of being able to watch events multiple times and change levels of analysis or observational focus with subsequent viewings (e.g., interaction between people vs. the movement of one individual in and out of a scene).

Videotaping also allows people not primarily involved in the fieldwork to participate in the analysis and opens up the range of perspectives that can be bought to bear on the analysis (e.g., Blomberg & Trigg 2000) used video collection tapes in interactions with product developers; also see Brun-Cotton & Wall, 1995; Karasti, 2001; Suchman & Trigg, 1991).

Video cameras can also be used to record events in the absence of the researcher. Not only does this free the researcher to be involved in other activities, but the camera also can be a silent presence[10] in situations where an outsider (even a well trained participant observer) would be seen as intrusive (e.g., child birth, counselor-student interactions, board room deliberations, etc.). This however requires devoting time later to review videotapes and incorporate relevant information into the analysis.[11]

Interviewing

Interviewing is a central tool of ethnographic research (Gubrium & Holstein, 2002). Conducted and interpreted in light of the potential differences between what people say and do, interviews are critical in developing understandings of members' perspectives. Interviews can be placed on a continuum from unstructured to structured, with at one extreme the casual conversation and at the other a formal structured interview.

Ethnographic interviews are most often open-ended, particularly during the early stages of fieldwork when the ethnographer is just beginning to get a perspective on the activities and people studied. The more unstructured format gives the researcher the freedom to alter the line of questioning as the interview unfolds. The researcher essentially is learning what questions are important to ask. Unstructured, however, does not mean haphazard or lacking purpose. The researcher will know the research objectives and the topics to be explored when entering the field, and will usually have an interview protocol to serve as a (flexible) guide for the interview. While the protocol provides a basic framework for an unstructured interview, the participant plays a major role in the direction the interview takes. As Bernard (1995) wrote, the idea is to "get an informant on to a topic of interest and get out of the way." When the interview moves to a topic of particular interest, the researcher can then probe deeper to elicit more details. Indeed, interviewing is something of an art, and one of the key skills an ethnographer learns is the art of "interrupting gracefully" (Whyte, 1960).

In an open-ended interview it is important to avoid using an interrogation style of questioning (e.g., "yes or no" questions) which is designed to uncover the "facts." This defeats the purpose

[10]However, the expressed permission of the participants in the interaction is needed in these cases as well.

[11]A variety of software applications now exist which can help the researcher manage and analyze recorded on video. Caveat, for example, allows the researcher to select and annotate images/events of particular interest. A more sophisticated (though less user friendly) program is Observational Coding System (OCS) which provides for a more quantitative analysis.

of keeping the interview open to allow for a wide range of responses and for the participant to express his experiences, his own way, with his own words. Using too structured a format constrains the range of possible answers, increases the chances of missing critical pieces of information, and increases the risk that discoveries will be limited by the ethnographers' preexisting concepts, assumptions, and hypotheses. It is critical to provide opportunities for participants to convey their stories and perspectives in their own way and for the researcher to be surprised by what people say and do.

As a project progresses and patterns begin to emerge, interviews can become more structured and the line of questioning less broad. The researcher begins to narrow in on topics that are particularly informative and relevant to the research objectives. Questions on the protocol become more focused and specific as answers to previous questions guide the follow-up questioning.

Once the range of responses is known and the data begins to show patterns and themes, the researcher may want to structure interviews further. A host of structured techniques exist. Some are designed to identify the ways people organize information within a specified domain, such as free listing, card sorts, triad's tests, and paired comparisons (Romney, Batchelder, & Weller, 1986; Weller & Romney, 1988). Other techniques, such as questionnaires and surveys,[12] are used to assess variations between two or more groups or to establish how representative the findings are for a larger population. The main idea behind these techniques is to keep the form and content of the questions consistent for each respondent, thus allowing for differences among the sample population to be ascertained. Conducting structured interviews at the end of an ethnographic study has the advantage of allowing the question structure and language to reflect the way participants talk about and organize experiences, thus increasing the validity of the survey findings.

SOCIAL NETWORK ANALYSIS

A research technique that has received a great deal of attention lately is social network analysis (Cross & Parker, 2004; Kilduff & Tsai, 2003; Scott 2000). While the data for social network analysis (SNA) can derive from records of activities (e.g., e-mail message exchanges, coauthorship, membership in organizations), often the data used in SNA analysis are based on responses to survey questions (e.g., How frequently do you interact via e-mail with the following people?). However, interpreting the results of SNA often relies on other sources of information (e.g., ethnographic research). For example, although a SNA may show that there is little communication between two groups of workers, it cannot reveal whether this communication pattern is limiting the effectiveness of the two groups or is an indication that there is little need for the two groups to interact. Interpreting the patterns highlighted in social network analysis requires other ways of gaining an understanding organizational dynamics.

THE INTERVIEW AS A COMMUNICATIVE EVENT

The interview has become somewhat ubiquitous in western societies and is viewed as a reliable means of acquiring information of all kinds (e.g., attitudes toward tax increases, the value placed on education, preferences for certain products, basic demographic data, etc.). However, as Briggs (1983) pointed out, what is said in an interview should not be thought of as "a reflection of what is 'out there'" but instead must be viewed "as an interpretation which is jointly produced by the interviewer and respondent." This view compels us to regard the interview as a communicative event in which the structure and context of the interaction conditions what the researcher learns. This is no less the case in highly structured interviews (see Jordan & Suchman (1990) and Moore (2004) for a critical analysis of the ecological validity of survey research). Briggs recommends that we adopt a wider range of communicative styles in our interactions with study participants, particularly styles that are indigenous to the study population.

INTERVIEWING RULES OF THUMB

While there are no hard and fast rules for interviewing, a few general guidelines will help facilitate the interview process and increase the chances of obtaining useful information. There are some points to remember:

- Interview people in everyday, familiar settings. Not only does this make the participants more comfortable, it allows them to reference artifacts in the environment that play an integral part in their activities. Moreover, a familiar environment is full of perceptual cues that can help jog the not-so-perfect human memory.
- Establish and maintain good rapport with participants, even if it slows the interview process.
- Don't underestimate the value of casual conversation. Some of the most insightful information comes from informal conversations when social barriers are lowered.
- Assume the respondent is the expert and the researcher the apprentice. This not only shows the participant respect, but also gives them confidence and facilitates conversation. Even if the interviewer happens to be more knowledgeable on a particular subject, the goal of an ethnographic interview is to understand the participant's perspective.
- Use lack of knowledge as a discovery tool. Participants will always know more about their own experiences than the interviewer will. In this context, don't interrupt unnecessarily, complete a participant's sentences, or answer the questions. Again, the idea is to learn about the respondent's point of view, not the researcher's. In this context, the researcher's "inevitable ignorance" about the experiences of another person can be a powerful tool.

[12]A good introductory book on surveys is How to Conduct Your Own Survey (Salant & Dillman 1994). Readers interested in a more advanced treatment of the subject are referred to Babbie (1990).

- When conducting an open-ended interview, avoid asking "yes or no" questions. Responses to these questions provide less information than questions beginning with "what" or "how."
- Be flexible enough to adapt the line of questioning when necessary. Human behavior is complex and full of surprises.

CONNECTIONS BETWEEN OBSERVATION AND INTERVIEWS

As noted earlier, one of the defining qualities of ethnography is its emphasis on holism. To obtain this holistic view, combining different sources of data is useful (Agar, 1996). Observation alone is seldom enough to adequately address research objectives. As such, observation is invariably coupled with interviewing. Interviews can extend and deepen one's understanding of what has already been observed. Similarly, interviews can be conducted prior to observing, giving the researcher a better idea about what is most appropriate to observe.

Interviews can also be conducted in the context of ongoing activities, sometimes referred to as "contextual" or "in situ" interviewing. Instead of setting aside a specific time and place for an interview, the researcher creates an opportunity to ask questions as participants go about their daily activities. The strategy can be extremely useful in getting answers to questions that are prompted by observation of ongoing activities.

Self-Reporting Techniques

In cases where the domain of interest transpires over a long period, or in which direct observation is not practically feasible, self-reporting techniques can be very valuable. This methodology is especially good at revealing patterns in behavior or obtaining data that is otherwise inaccessible (Whyte, 1984). A number of self-reporting techniques exist which vary in terms of form, focus, structure, and mechanism of self-reporting. Common techniques range from simple written diaries to visual storybooks, and more recently to Internet-based (and often multimedia) "blogs."

DIARIES

Traditional diaries consist of written records, which might include personal thoughts or descriptions of specific behaviors or accounts of events in which an individual participates. The focus, format, and degree of structure of diaries used in ethnographic research vary depending upon the research objectives, ranging from structured activity logs which invite the participant to capture and describe specific aspects of her experiences for each entry, to relatively unstructured forms in which diarists are provided only with general instructions. Study participants might be asked to keep diaries regarding the specific contexts, foci, modalities, and outcomes of their interactions or they might simply asked people to describe their experiences over time while using a specific product.

How diaries are analyzed depends on the research objectives and resource constraints. If time permits, follow-up discussions with participants to clarify points or gain a deeper understanding of the meaning behind the words can be useful. The texts can also be coded for themes, key words, or phrases and patterns examined across individuals or between groups.[13]

VISUAL STORIES

Visual stories are essentially pictorial diaries that employ images in addition to text in order to document experiences. They can be particularly valuable when working with non-literate participants, such as children, or in situations where words alone are inadequate to capture the essence of the subject (Johnson, Ironsmigh, Whitcher, Poteat, & Snow, 1997). Much like more traditional text-based diaries, visual diaries can be employed and structured in any of a number of ways. Wasson (2000), for example, described giving participants a written guide directing them to take photographs of their interaction with a product under study. They were then asked to organize the developed photos into a story that made sense to them, and researchers conducted follow-up interviews over the telephone.

A more open-ended framework can also be informative. Interested in cultural differences between Italian and American fishermen, Johnson and Griffith (1998) instructed participants from both groups to take photographs of whatever they wanted. After developing the film, Johnson coded the pictures based on their content and found significant thematic differences between the groups, which added to his understanding of differences in cultural values of the two groups of fishermen.

A more recent derivation of the visual story utilizes a video camera which allows the participant to provide a running narrative alongside the visual content. Being able to experience the two sources of information simultaneously provides the researcher with a rich record of an activity. Blomberg, Suchman, and Trigg (1996) used a video-story approach in their study of the document practices of lawyers. They set up a stationary video camera in the law office of a study participant and asked him to turn on the camera whenever he had occasion to retrieve documents from his file cabinet. The running narration recorded on videotape provided insights into the everyday use of the file cabinet that helped inform the design of an electronic file cabinet.

WEBLOGS (e.g., "BLOGS")

As Internet technology has evolved along with the accessibility and ease of digital media capture and online sharing, forms of self-reporting are evolving rapidly. Most recently, this is evidenced by the proliferation of Weblogs—better known as

[13]With varying degrees of success text analysis software have been used to help with large data sets. Some noteworthy programs: Ethnograph, NUD*IST, E-Z-Text, and NVivo.

"blogs"—in which a website is used to "post" online entries that may include textual narratives, digital photos, or digital video/audio. Although not developed specifically to support ethnographic inquiries, blogs can be a potentially very valuable research tool. Blogs may be particularly useful as a way for participants to self-report their use of online tools in the context of their online activities. Blogs also enable researchers to review participant "posts" as they occur as well as to engage in asynchronous online exchanges and dialogues with participant "bloggers". Indeed, as blogs increasingly are used in ethnographic research, they may blur the boundary between self-documentation and interviews, resulting in a blend of online self-reporting and intermittent online "conversations" via threaded participant/researcher posts.

Remote "Virtual" Observation

Continuing technological developments—in video, audio, wireless, network applications, tracking capabilities, and pervasive computing—have created new opportunities to "observe" and collect rich and dynamic information across geographies in real time as well as asynchronously. These technologies increasingly enable ethnographers to "virtually" observe in a wide variety of contexts. Using digital video and audio, people's behaviors can be tracked and analyzed as they interact with computer supported products and Internet-based networks.[14] Indeed, these technologies (along with the use of other digital tools such as blogs) enable what some have begun to refer to as "digital ethnography" (Masten & Plowman, 2003).

The pervasiveness of the "web cam" is perhaps the simplest illustration of how technology has expanded the observational capabilities of ethnographers. Internet-enabled digital video cameras can stream video in real time and can be remotely controlled. This digital video and audio can be viewed by multiple people across geographies either in real time or by accessing video archives. Such techniques and information sources can be particularly useful for geographically distributed research and design teams.

In addition, computer and online sensing, tracking, and analytic technologies that monitor, gather, collect, and integrate information on peoples' computer mediated activities can be a useful source of information for ethnographers. Although early tracking and analytic technologies required complex sifting and analysis of massive amounts of data to find meaningful nuggets, more recent tools enable sophisticated tracking of individual paths and activities as well as the ability to model online behavior. For example, "scenario"-based behavioral models (e.g., of online shopping, exploratory behavior, task completion, etc.) which define hypothesized patterns or sequences ("funnels") of online behavior can be used as an analytic lens to understand individual or group online behaviors. To date, these tools have been used primarily to measure aggregate completion of online tasks (e.g., online shopping, self-service) and to identify obstacles to user success (e.g., usability issues). However, over time and in conjunction with other sources of data and information they may become useful tools for ethnographers interested in patterns of online behavior and technology adoption. This may become particularly important as ethnographers attempt to understand the formation and interactions of distributed virtual communities (e.g., Rheingold, 2000).

The potential for using (and misusing) these sources of information will likely increase exponentially as pervasive computing increasingly enables the identification of (and response to) individuals across multiple physical and digital environments and the tracking of their activities. The collection and use of digitally enabled behavioral observations obviously needs to be carefully constrained by ethical considerations, particularly the respect for privacy and informed consent. In addition, as with any behavioral observation, it is critical to understand the context in order to interpret the meaning and significance of the behavior. In this respect, tracking computer-mediated behaviors by itself is insufficient and may simply result in the collection of massive amounts of relatively meaningless data. However, if used in conjunction with other sources of information (e.g., self-reports that illuminate peoples' intentions and meanings), patterns in digital behavior can illuminate aspects of behavior that are difficult or impossible for a human researcher to observe.

For example, it has been increasingly common for teams designing online services and tools to examine individual and aggregate patterns of online behavior (as reflected in web server logs or "client side" logs that are generated as a function of what users do online) to both identify usability issues as well as to examine patterns of technology, product, and service adoption over time (Kantner, 2001).

Artifact Analysis

Ethnographers have long had an interest in the material world of the people they study. The artifacts people make and use can tell us a great deal about how people live their lives.[15] Artifact analysis can be an important part of contemporary ethnographic studies (e.g., Rathje & Murphy, 1991). For example, conducting an artifact analysis of the stuff on people's desks can say a great deal about the people's work practices. Similarly, studying the contents of an automobile's "glove box" can tell a great deal about how the car is used. Depending on the kinds of research questions asked, it may be useful to include the collection and analysis of specific artifacts.

Recordkeeping

Although the authority of the ethnographic voice derives in part from the fact that the ethnographer is present and witness to

[14]The ability to virtually observe and track behaviors presents many ethical issues that cannot and should not be ignored. It is critical that ethnographers establish guidelines and protections if they engage in electronic, digitally enabled observations.

[15]Archaeologists rely almost exclusively on the artifacts that remain in archaeological sites for their interpretations of the behavior and social organization of past human societies.

events of interest, the ethnographer should not rely exclusively on experiential memory of these events. In all ethnographic research it is essential to keep good records. Field notes should be taken either during or soon after observing or interviewing. The specific nature of the notes will depend on the research questions addressed, the research methods used, and whether audio or video records supplement note taking. Field notes should at least include the date and time when the event or interview took place, the location, and who was present. Beyond that, notes can vary widely, but it is often useful to indicate differences between descriptions of what is observed, verbatim records of what is said, personal interpretations or reflections, and systematic indications of the flow of observed events and activities. When working with a team of researchers, field notes need to be understandable to other team members. This is often a good standard for the specificity of field notes even when working alone. If such a standard is maintained, it will be more likely that the notes will be useful to the researcher months and even years later, in the event reanalysis or a comparative study is undertaken.

Qualitative and Quantitative Data

In a previous section we touched upon the complementary nature of observational and interview techniques and the benefit of combining these two approaches. Triangulation of data can serve to connect quantitative and qualitative data as well. Sometimes, prior to the start of a project the only data available is quantitative, sometimes in the form of survey data focused on population characteristics. Qualitative data derived from ethnographic research can complement quantitative research by providing a meaningful context for interpreting the quantitative results. Qualitative techniques allow researchers to dig deeper after a survey has been tabulated, and aid in interpreting and explaining trends that the quantitative data might reveal (Guest, 2000). In addition, qualitative data can inform the content and language of more structured questions, thus making them more meaningful and relevant to the participants.

Ethnography in a Global Context

While ethnography has its roots in the study of small-scale, non-Western societies, the application of ethnography in the design of products and services has focused primarily on groups and individuals located in the developed regions of the world (e.g., North America and Europe). Two recent developments have led to a shift in the center of design activity. One is the emergence of the economies of less-developed countries, particularly Brazil, Russia, India, and China, the so-called BRIC countries, which are rapidly becoming major markets for products and services. An interest in serving these growing markets has led some firms to invest in designing products and services specifically for them by directly engaging designers, developers, and potential users from these developing regions (e.g., HP and Intel). The second development is the rapid increase in the use of Internet-enabled information technologies that connect workers, consumers, citizens, and organizations distributed around the world.

SHIFTING DESIGN FOCUS

As new markets open up around the globe, many businesses and organizations see an opportunity to create products and services specifically for these markets recognizing that the products and services suited for the developed West may not be appropriate for these other regions. As such these companies have established design initiatives focused on and located in countries like India and China. In some respects ethnography has come full circle in its application to design, contributing to understandings of the local contexts of people living in culturally and linguistically diverse settings (the sites in which ethnographic practice first developed). More than ever ethnographic principles and practices are applicable and necessary as the center of design activity moves outside the developed West.

GLOBALLY DISTRIBUTED INTERACTIONS

The methods and techniques of ethnographic research must contend with the increasing number interactions both at work and in domestic spheres that take place "virtually" between people separated in space and time. This is a challenge for ethnographic techniques that were developed to study communities of people who interact face-to-face. Our techniques and approaches must be adapted both practically and analytically to this new context where many more interactions are mediated by information technologies (e.g., instant messaging, blogs, e-mail, telephone, web conferencing, shared digital workspaces, and repositories) that transform traditional notions of place and real-time interactions. In many enterprises work teams are made up of people who are not co-located, many of whom are highly mobile in their work activities, requiring interactions to take place through conference calls, instant messaging, and e-mail. Furthermore, in some regions of the world, people travel significant distances for jobs and other opportunities. In these cases, interactions with friends and family, as well as with others living away from their native communities, are enabled by communication technologies (Horst & Miller, 2005; Green, Harvey, & Knox, 2005). Various strategies have been developed to study distributed, multisited groups including team ethnography (placing researchers in multiple locations), perspectival ethnography (focusing on the view from one of the local sites), and virtual observations (observing digitally mediated interactions).

MAKING ETHNOGRAPHY MATTER: COMMUNICATING AND APPLYING ETHNOGRAPHIC INSIGHTS TO DESIGN

This section outlines some of the ways in which the insights derived from ethnographic work can be represented and communicated in order to effectively inspire and guide the design of products and services. These ways of representing and communicating what is learned are intended as examples of how ethnographic work can be made relevant for design. However, before

we outline some of these representational forms and practices we should consider the possible foci of our design activities.

Designing What?

The application of ethnography to support a design agenda was directed initially toward informing the design of technologies, tools and products. However, more recently attention has expanded to include the use of ethnography to inform the design of experiences (Pine & Gilmore, 1999), services (Thomke, 2003), organizational processes, and business strategies and models. The establishment of a design school (the "d-school" as it is called) at Stanford University in 2005, dedicated to teaching "design thinking . . . to solve big problems in a human centered way," points to the expanded role ethnographic research can play in informing design, beyond the design of products. (http://www.stanford.edu/group/dschool/big_picture/our_vision.html.) Ethnographers are now involved in projects and contexts that span a range of problems from helping to design the next e-mail application, to designing tools to support system administrators, to new business models to reach small and medium businesses with IT services, to new customer services for retail banking. Moreover, the adoption of a technology is usually associated with changes in user experiences, individual work practices, and/or organizational models and processes which can also be within the scope of the design focus.

PRODUCTS

The application of ethnography to product design has received the most attention in the literature partly because many of the pioneers in the field worked in corporate research organizations of major technology companies (e.g., Xerox, Apple, and HP). In addition, early commercial applications of ethnographically informed design often focused on the design of consumer products, from cleaning products to automobiles to toys (Elab, Doblin group, Sonic Rim). It is not surprising therefore that many view product design, whether high-tech products like PDAs and online calendar applications or everyday consumer products like breakfast cereals and cold remedies, as the primary application of ethnographic research (Squires & Byrne, 2002).

EXPERIENCES

The publication of the Experience Economy (Pine & Gilmore, 1999) marked a shift in design focus to include the experiences that products and other artifacts enabled. Pine and Gilmore argued that the real challenge for businesses is creating engaging experiences for both consumers and corporate customers. The admonishment by a number of business gurus to pay more attention to the customer in the design of products also contributed to this expanded focus. Customers, it turned out, cared less about the products themselves and more about what the products enabled them to do or experience. Businesses became concerned with delivering quality experiences in which the products took on more of a supporting role. The canonical example often cited for this shift to an experience economy is Starbucks, where what is being sold is not simply a cup of coffee, but the experience of buying and consuming the coffee at Starbucks, including the elaborate choices available, the wireless access provided, the exclusive access to trendy music, and so on.

SERVICES

The service sector has come to dominate much of the world economy and increasingly new services are the site of significant change in the way we work and play (e.g., online dating services, GM's OnStar, business process outsourcing). While many innovative services are made possible by new technologies that provide the platforms[16] on which new service relationships are built, the value being exchanged is the service provided, not the technology per se. Ethnographically informed design strategies are now being applied to service design (Thomke, 2003).

ORGANIZATIONAL PROCESSES

Workflow systems have become ubiquitous within many organizations, orchestrating everything from employee travel-reimbursement processes to customer online-purchasing procedures. With this comes the opportunity to inform the design of these technology-enabled organizational processes through the study of existing work practices and processes. Here again the design focus is not so much on the underlying technologies (e.g., SAP, Siebel) that manage the workflow, but on the processes themselves. This is not to say that these studies will have no impact on the underlying technologies—for example, making them more flexible or end user configurable. But the design focus is on the workflow requirements, how people will interact with these systems and will be supported in executing processes.

BUSINESS STRATEGIES AND MODELS

Ethnographic research is also playing a role in the design of business strategies and models. Organizations are realizing that their competitive advantage is only partly related to the quality of their products and services. Equally important are the business strategies, including channels to the market, relationships with business partners, and the composition of employees. Many new business models have emerged in the last decade that capture new revenue streams such as advertising (e.g., Google, Yahoo), selling software as a service (e.g., salesforce.com), and facilitating networks of sellers and buyers or customers and providers (e.g.,

[16]See, for example, Service Oriented Architectures (SOA).

eBay, regional IT distributors). Ethnographic research can and is helping to inform these new business models.

Representations and Models

Whether the focus is on designing products, experiences, services, processes, or business strategies, the researcher must find ways to ensure that ethnographically derived insights effectively inform design innovations and decisions. Researchers can help make connections between ethnography and design in many ways. At the most basic level, this is achieved through active engagement, integration, and collaboration of researchers and designers.[17] Subsequent to conducting ethnographic inquiries, researchers can engage with design teams by acting as user proxies (e.g., helping to formulate and/or review design concepts in scenario-based reviews, providing feedback regarding relevant user expectations and behaviors as they relate to design concepts and decisions, etc.). Conversely, the active and direct involvement of designers in key elements of ethnographic fieldwork (e.g., participating in observations and interviews, collaborative analysis sessions, reviewing video and audio recordings and user artifacts, etc.) can enrich their understanding of the people who will interact with and use the solutions they design.

Although these forms of engagement are valuable, they limit the ability of teams to take full advantage of ethnographically derived understandings. They are restricted in the impact to the scope of the direct interactions between ethnographers and designers. This can be particularly limiting when designing multifaceted solutions, working with large and/or distributed design and development teams.

THE VALUE AND FUNCTION OF REPRESENTATIONS AND MODELS

To increase the value and impact of ethnographic research, explicit representations or models can be created which distill and communicate essential insights about people's experiences in forms that can be applied to design problems and decisions. Although the definition of *model* can be the subject of debate (as can the distinction between *representation* and *model*), for our purposes we are using the term to refer to explicit, simplified representation of how people organize and construct experiences and operate in relevant domains. The important point here is that well-constructed representations which communicate effectively can help connect everyday patterns of activity and experience with design solutions. More specifically, representations and models are tools that can serve a number of purposes including: enhancing the working models of designers/developers, supporting innovation and creativity, evaluating and prioritizing ideas and concepts, and providing guiding principles and shared reference points for design teams.

ENHANCING THE WORKING MODELS OF DEVELOPERS

In order to design a technology solution for people, designers must have at least an implicit working view of the people who will interact with the solution. Such working frameworks and perspectives may include assumptions about a range of essential characteristics of the people who will engage with the solution and the contexts in which they will do so (Newman, 1998). Indeed, some would argue that successful design requires a high degree of "empathy" with the target population (e.g., Leonard & Rayport, 1997; Koskinen, Battarbee, & Mattelmäki, 2005). Implicit and/or explicit assumptions or knowledge about "users" may be formed through some combination of direct experience (e.g., interacting with and/or observing people in the target population in controlled or noncontrolled settings) and secondary learning (talking with others about the target group, viewing videotapes of target activities, reading, analogy to other directly experienced groups, etc.). However formed, the working "models" of designers/developers may be of varying levels of complexity, robustness, coherence, consistency, and viability. The broad, deep, and contextualized understanding provided by ethnographic research can enrich the design team's implicit working models.

SUPPORTING INNOVATION

The design of technology solutions for people obviously poses a range of potential creative challenges at varying levels of complexity. What problems should be solved? What should be built? What kinds of experiences should the technology solution support or enable? What features and functions would be useful, compelling, and satisfying for a particular group of people in a particular domain/context? How can existing or emerging technological capabilities be used to enhance a particular group's, or to solve a particular problem? Even if there are clear parameters defining the functionality that will be built (e.g., a set of "requirements"), design teams must still generate a compelling, easy to use, useful, and satisfying way of delivering that functionality. By providing an understanding of the human domain (patterns of relationship, systems of meaning, organizational structure, guiding principles or rules, etc.), ethnography can promote creativity that matters (Robinson & Hackett, 1997)—relevant innovations that create new, realizable opportunities.

EVALUATING AND PRIORITIZING IDEAS

Design teams not only face the challenge of generating innovative ideas and concepts, but also the equally important task of evaluating and prioritizing ideas and options that arise from var-

[17]As noted earlier, the ethnographer should develop an understanding of the types of design decisions that the design team will need to make and a sense of what they need to know to inform those decisions.

ious sources (e.g., business stakeholders, end users, development teams). Although there are obviously many evaluative methods (e.g., scenario-based user testing, etc.), models derived from ethnographic research and analysis (e.g., scenario models, mental models, interaction/social network models, etc.) can provide a critical lens through which development teams can evaluate and prioritize ideas based on how they may fit into, not fit into, or change people's experiences. The need for evaluation and prioritization may occur at various points throughout the development process, ranging from decisions about features and functions, broad directions for design concepts, and so forth.

GUIDING PRINCIPLES AND SHARED REFERENCE POINTS

The learning derived from ethnographic analysis, particularly when represented as explicit representations and models, can serve as an experiential guidepost for individual designers and design teams throughout the development process. Even though these representations do not prescribe or specify what should be done, they can aid developers by focusing attention on essential aspects of an experience, highlighting variations in the experiences, and limiting exploration of experiential "dead ends." In other words, they can provide a general structure and direction within which a team can develop a shared understanding and focus its creative energies.

TYPES OF REPRESENTATIONS AND MODELS

Representations and models can vary, ranging from personas and scenarios to more abstract mental models and more complex work-practice models. The number, type, and form of models vary as a function of what is being designed, the audience, and the constraints on the design process. (e.g., K. Holtzblatt, Chapter X; Redish & Wixon Chapter X). For example, teams designing organizational tools may find it useful to model work environments and detailed task sequences; teams designing learning tools and programs may want to represent particular skill domains, as well as learning processes.

Practitioners have developed a variety of representations and models to inform the design-and-development process. For example, Beyer and Holtzblatt (1998) described a set of five work models (flow model, cultural model, sequence model, physical model, and artifact model) to reflect different aspects of a work domain. Pruitt and Grudin (2003) articulated the value (and risks) of personas to inform the design process, while Carroll (2000) described the value of scenarios.

SAMPLE REPRESENTATIONS AND MODELS

The varying scope, form, complexitym and function of different types of models are illustrated in following examples.

EXPERIENCE MODELS

The model presented in Fig. 50.2, is one of several developed in the context of ethnographic research and analysis for a financial services company serving individual investors. This company aimed to develop web applications that would facilitate customers' active engagement in the investment process with particular financial instruments. The model was intended to articulate and visualize a financial development process as well as

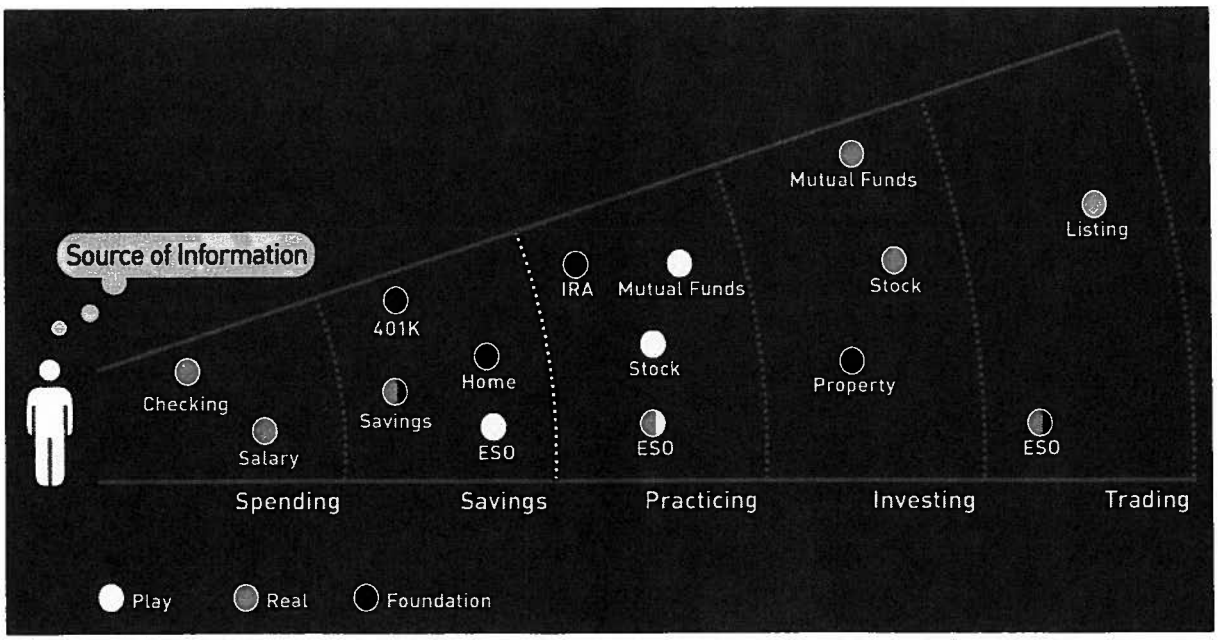


FIGURE 50.2. Financial development zones model.

the varied meanings of "money." This particular model highlighted the role of "practice" in developing the confidence and knowledge to become engaged in the investment process, and the iterative/recurrent nature of the process, as people learned to deal with new financial instruments and domains (e.g., securities, bonds, options, etc.). Moreover, it illustrated the distinctions that people make between "real," "play," and "foundational" money and the relationship between these categories, investment behavior, and financial development. To oversimplify a bit, people are more fully engaged and active in the investment process when they view the assets/investments as "real" (e.g., money that is used to address their current and emerging needs, pay bills, etc.) rather than as "play" (e.g., stock options that are perceived as intangible and somewhat imaginary) or "foundational" (e.g., savings for the future that are left "untouched"). As people have an opportunity to "practice" and develop their knowledge, they may move from construing a particular financial instrument or activity as "play" to "real." These notions suggested that web applications in this domain should not be focused on simply providing a wealth of financial information or a plethora of tools. Instead, these patterns helped to foster the generation of numerous ideas about ways to engage people in playful learning in the financial domain, with the aim of facilitating the financial development process.

PROCESS MODELS

Process models attempt to represent how a dynamic experience "works" and/or unfolds over time. They can range in focus from relatively circumscribed task-flow models that outline how an individual completes a specific task, to broader characterizations of more holistic change processes (e.g., healthcare behavior change, technology adoption, etc.). For example, a health services company aimed to develop an "electronic medical record system" (combining client server applications with web based "portals"). This system would, among other things, increase the efficiency and effectiveness of their medical practice, enable patients to view their health records online, and ultimately empower patients and foster a proactive approach to wellness and healthcare (both by clinicians and patients).

At the outset of the engagement, the health services company had generated a rather long requirements list (several hundred features and functions) and a particular view of the structure and function of the web components of the system. It was clear that the budget for this initiative was not sufficient to build a system that met all of the initial "requirements." Perhaps more importantly, it was unclear which components would ultimately add the most value for the various stakeholders (clinicians, patients, the business owners, etc.). Ethnographic research examining the experiences of and relationships between clinicians and patients in context (in clinic settings and in homes) provided the means of prioritizing and evaluating potential features, functions, and design concepts.

Experience models of varying levels of complexity regarding the health management process were developed. For example, one of the simpler models (see Fig. 50.3) described how individuals, in the process of adopting an active/proactive stance in relation to health issues, move through varying "stages of readiness." A more comprehensive, integrative model highlighted the ways in which various factors interact in influencing a person to take action in addressing a health issue and mapped the role of various healthcare related activities (e.g., monitoring, motivating, learning, sharing, building rapport) in various stages of readiness. The combination of these models enabled the team to identify the most important opportunities for facilitating progression towards a proactive orientation to health, and provided guidance in identifying ways to provide messages and experiences tailored to a person's stage and readiness.

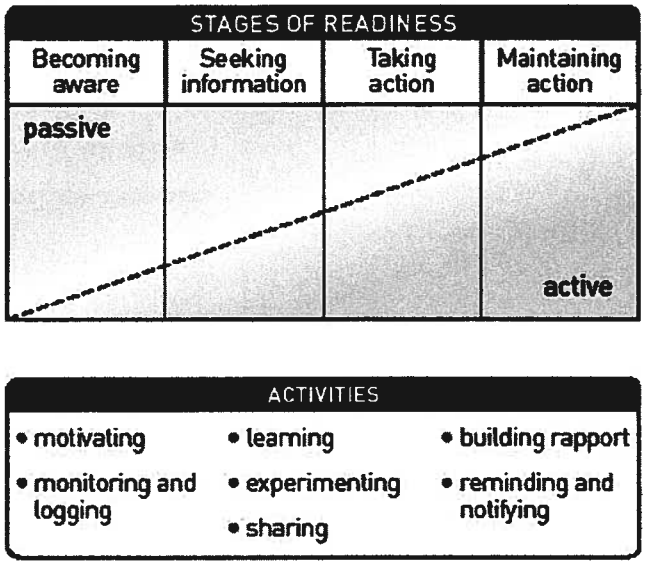


FIGURE 50.3. Stages of readiness model.

PERSONAS

One of the primary challenges in developing interactive systems is to design them so that they meet the needs of varying users, who may play different roles, engage in varied tasks, have different motivations and strategies, and so forth. Profiles or personas are abstract representations of the users of a solution (Pruitt & Grudin, 2003) which may be informed through ethnographic studies. Personas can help development teams understand and anticipate how certain types of people may experience and interact with technology solutions. For example, Fig. 50.4 shows a simple persona developed to guide the design of interactive tools promoting the adoption of various financial and health benefit programs in a large enterprise. Note that the persona focuses characteristics (attitudes, life stages, scenarios, etc.) that are most relevant to the person's experiences in managing financial and health-related concerns.

The value of personas can be enhanced by making them visible and dynamically present for design and development teams (e.g., posters displayed in project rooms, multimedia representations that are reviewed with development teams, role-playing scenarios and walkthroughs based on profiles, etc.). Rich and

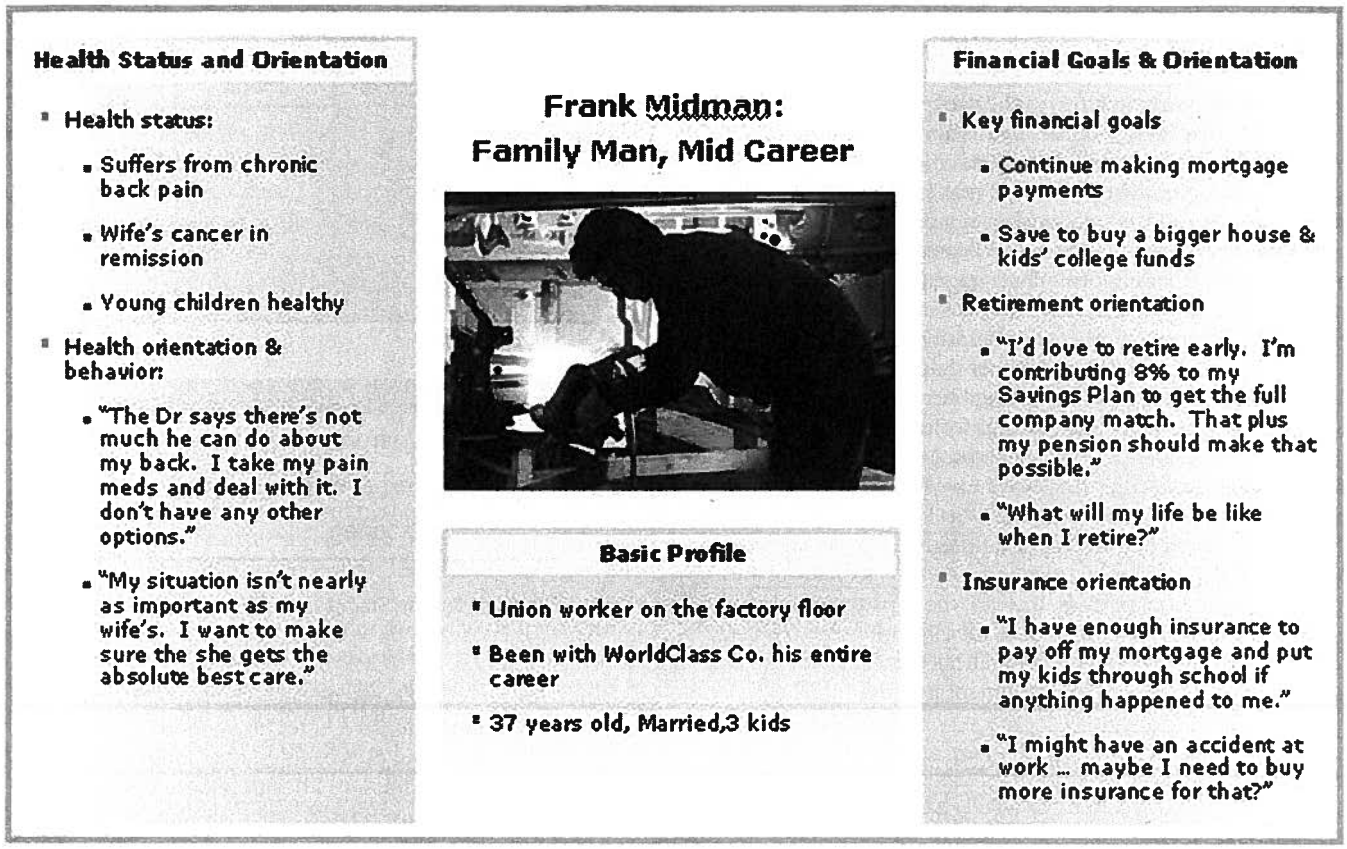


FIGURE 50.4. Financial and health benefit program design persona.

dynamic representations of essential characteristics of individuals can serve as a common frame of reference for communication and a tangible reminder to development teams regarding the people for whom they are designing the system. Moreover, personas can be used systematically in a range of ways to help teams make design decisions. For example, Pruitt and Grudin (2003) described specific techniques they have used to systematically apply personas to aid in feature prioritization decisions.

SCENARIOS

Scenarios are another way ethnographic research findings can be portrayed (Carroll, 2000; Nardi, 1992; Sonderegge, Manning, Charron, & Roshan, 2000; Rosson & Carroll Chapter X). Scenarios illustrate experiences and actions unfold in specific contexts or situations (Fig. 50.5) and can be documented in various forms ranging from narratives to annotated visual flow diagrams. They may highlight interactions (with computer systems, people, business entities, etc.), decisions processes, activity sequences, influencing factors, and so forth. They also may illustrate the different ways in which varied groups or types of people experience and navigate through similar situations. Analysis of scenarios can foster the identification of areas of difficulty ("pain points") and experiential gaps (or opportunities), that may be addressed or enhanced through various design solutions. When integrated with personas, they can illustrate how different target audiences navigate through the same situation, which in turn can suggest ways in which solutions can and should be adapted for varying target audiences.

MOCK-UPS AND PROTOTYPES

Representational artifacts, be they paper prototypes, mock-ups, or working prototypes, can play an important mediating role in connecting use requirements and design possibilities. When informed by studies of practice, these design representations respecify practices and activities in ways that are recognizable to practitioners. The prototypes go beyond simple demonstrations of functionality to incorporate materials from the participants' site, embody envisioned new technological possibilities, convey design ideas in relation to existing practices, and reveal requirements for new practices. Prototyping practices as such recover and invent use requirements and technological possibilities that make sense each in relation to the other (Suchman, Blomberg, & Trigg, 2002). In addition these representational artifacts facilitate the communication of what has been learned about technologies-in-use to the larger research and technology-development communities.

In an ethnographic study of engineering practice at a state Department of Highways, design prototypes critically deepened

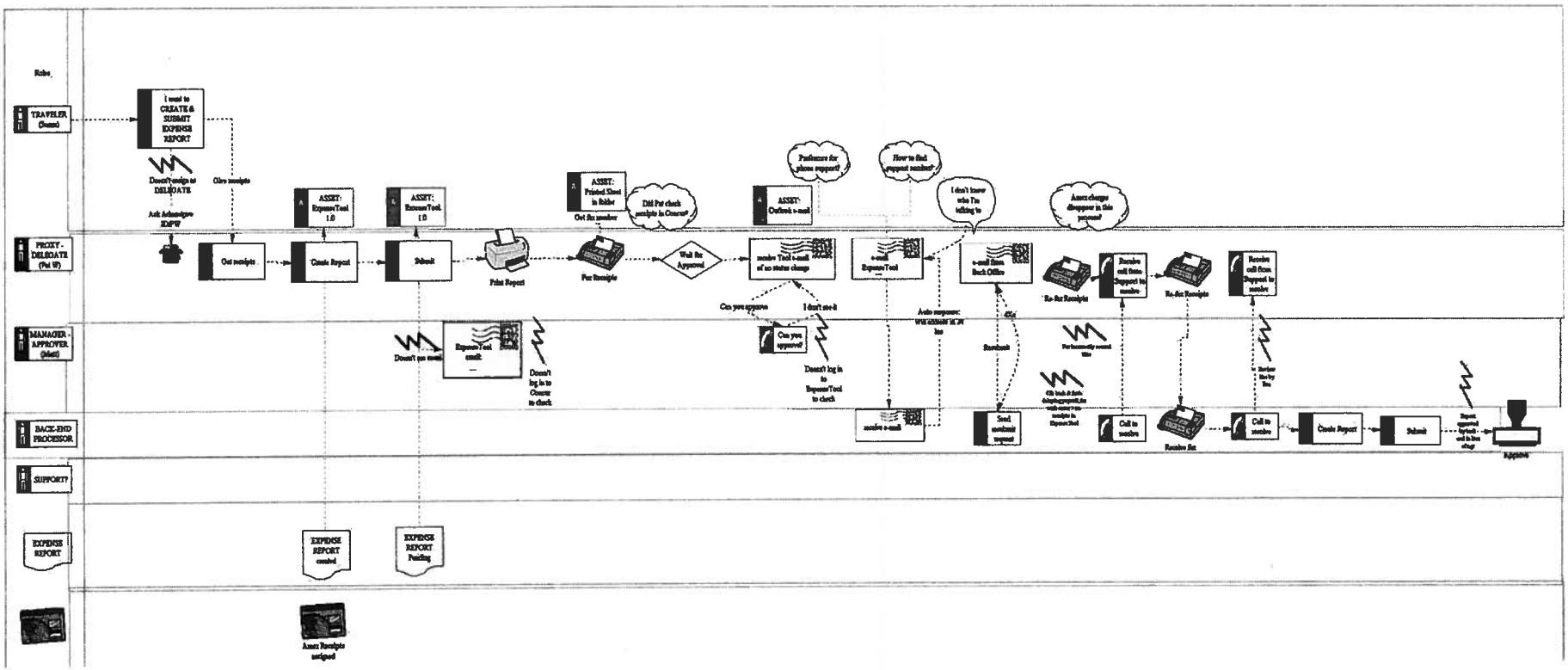


FIGURE 50.5. Scenario flow model.

the researchers understanding of the requirements of the work of document filing and retrieval (the focus of the study). At each step, from early design discussions with practitioners, to the creation of paper "mockups" of possible interfaces to the online project files, and finally to installing a running system at the worksite, the researchers became more aware of the work's exigencies. For example, in recognition of some of the difficulties that engineers experienced with their filing system various alternative document-coding strategies that augmented the existing filing system were designed. Through successive rounds, in which engineers were asked to code documents using mocked-up coding forms (both paper-based and online) the researchers understanding of the requirements of the work deepened. Eventually, the search and browsing interfaces evolved to be more finely tuned to the requirements of the engineers' work (e.g., Trigg, Blomberg, & Suchman, 1999).

CAVEAT REGARDING REPRESENTATIONS AND MODELS

Although representations and models are valuable tools for connecting ethnographic understanding and design, they can also have negative effects. Although grounded in observations and other forms of ethnographic inquiry, models are always a selective interpretation and construction of experience. Thus, while representations and models can focus attention on and illuminate important aspects of experience, they can also become reified stereotypes and constraints that inhibit design possibilities. Ongoing inquiry, a critical perspective, and a willingness to evolve the representations in the face of new learning are essential to maintain the viability and value of models for design.

RELATION TO OTHER QUALITATIVE APPROACHES AND PERSPECTIVES

The ethnographic approach has strong connections to and affinities with other approaches that have contributed to the development of the field of human-computer interaction, namely distributed cognition, activity theory, ethnomethodology, and participatory design. There is not space here to go into depth on any of these approaches. Our aim is simply to highlight relations between these approaches and ethnography, and provide a way to distinguish between them.

Distributed cognition (sometimes referred to as social or situated cognition) was first introduced to the HCI community by Lave (1988) and Hutchins (1995). Distributed cognition located cognition in social and material processes. When it was introduced, it challenged the dominant paradigm within HCI, that cognition primarily involved the psychological and mental processes of individuals. The connection between distributed cognition and ethnography is not only in the insistence that our understanding of human activity be located outside individual mental processes, in human interaction, but also in the conviction that to gain an understanding of human activity, ethnographic, field-based methodologies are required.

Activity theory also shares with ethnography a commitment to field-based research methodologies. In addition, there is the shared view that behavior (activity) should be a primary focus of investigation and theorizing, and a recognition that objects (artifacts) are key components in descriptive and explanatory accounts of human experience (e.g., Engeström, 2000; Nardi, 1996).

Ethnomethodology is often used interchangeably with ethnography in HCI literature. This is not only because the terms are etymologically similar, but also because many of the social scientists contributing to the field of HCI have adopted an ethnomethodological approach (e.g., Bentley et al., 1992; Button & Harper, 1996; Crabtree, 2000; Hughes et al., 1993, 1994, 1995) with its focus is on locally and interactionally produced accountable phenomena. Ethnomethodology's particular set of commitments (e.g., Heritage, 1984) are not shared however by everyone working within the ethnographic paradigm.

Participatory design does not have its roots in qualitative social science research, but instead developed as a political and social movement, and as a design approach committed to directly involving end users in the design of new technologies (See Muller, this volume; also Schuler & Namioka, 1993; Kensing & Blomberg, 1988). Within the HCI context, participatory design has shed some of its political and social-action underpinnings, and often is viewed primarily as a set of methods and techniques for involving users in design. Its connection to ethnography is in the commitment to involve study participants in the research, and in the value placed on participants' knowledge of their own practices. Also in recent years, those working in the field of participatory design have incorporated ethnographic techniques (e.g., Crabtree, 1998; Kensing, Simonsen, & Bødker, 1999) as a way of jointly constructing with participants knowledge of local practices.

ETHNOGRAPHY IN ACTION

Case Study 1: Designing a Program and Website to Change Healthcare Behaviors

A large global company, providing health insurance coverage to over 60,000 of its employees in the United States, developed a multifaceted program to reduce its healthcare costs and optimize the health and productivity of its workforce. The major goals were to provide reliable healthcare information and to promote better healthcare decisions. The program provided a number of online and offline resources for employees (e.g., a 24-hour medical hotline, a research team that would provide gather and summarize treatment outcome research findings for severe medical conditions, online access to a leading edge medical information/content website, etc.). The company initially promoted the program through a series of face-to-face workshops designed to convey the limitations of standard medical practice, encourage a consumer-oriented approach to healthcare, and make people aware of resources provided by the company.

After the initial launch, the team became concerned that the health program resources, including the website were being underutilized by employees, limiting the potential impact and value for both employees and the company. In this context, the

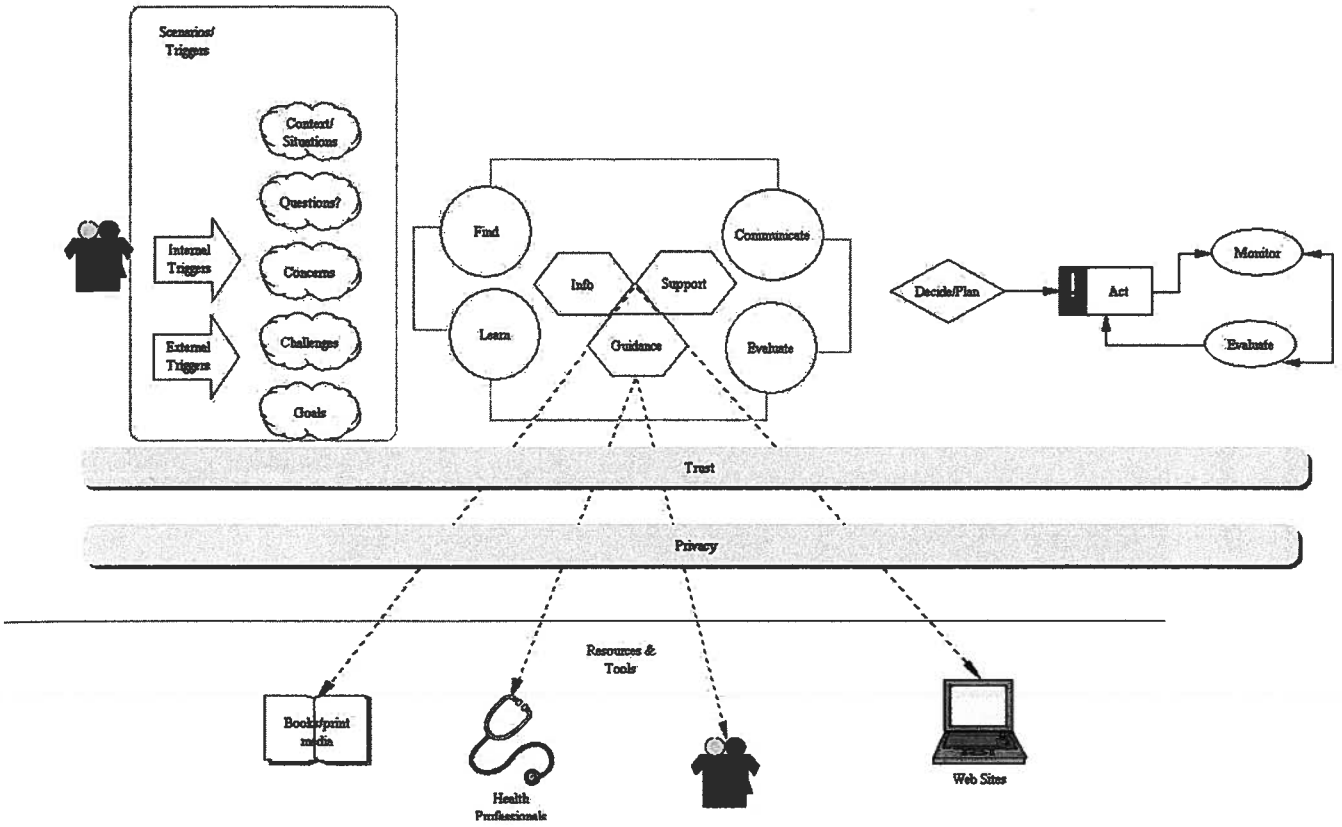


FIGURE 50.6. Healthcare decision-making model.

team initiated a study to evaluate the current program and website as well as well as to establish clear user models and strategic frameworks to guide website/program redesign efforts. To meet the project objectives, the research team conducted ethnographic inquiries combined with scenario-based exercises. In order to extend the participant sample as well as to deal with practical constraints (very limited time and resources), the team conducted some of the interviews and assessments remotely, via telephone and web-conferencing tools. Ethnographic inquiries focused on understanding the varied ways that people managed their healthcare (and/or the healthcare of family members), including their overall orientations to health and wellness, relationships and interactions with healthcare providers (and other family members), and their healthcare-decision-making processes. The latter included understanding the online and offline resources and tools that people used and the major healthcare scenarios they addressed. After exploring and profiling participants' healthcare experiences, they were asked to work through an actual healthcare decision scenario, while being invited to engage with the program resources and website.

Based on these inquiries, the research team developed a number of experience models including: a set of personas highlighting key variations in healthcare orientation and behavior that the program/website design team would have to accommodate; a simple typology of health-related scenarios (e.g., managing severe and chronic medical conditions, dealing with common everyday healthcare issues, and "wellness"/risk reduction); scenario flow models (Fig. 50.5) documenting how varied types of people made decisions (Fig. 50.6) and used a range of resources to address key health scenarios.

These models along with other resources generated numerous insights about limitations of the current website and program, opportunities for program/website enhancement, and design recommendations. For example, user profiles and scenario models showed how the program was fragmented and did not effectively align with people's key health scenarios, forcing an individual to painfully sift through resource information and descriptions to figure out which resources might be most relevant and useful in a specific scenario. In addition, the program and the website did not adequately address "wellness"/risk reduction scenarios which represented a significant concern for almost all employee segments and presented an important opportunity for the company to promote a proactive and preventative approach to healthcare.

In order to connect the user insights with the program/website design, the team articulated a number of design principles and a specific scenario-based design framework (Fig. 50.7). This framework highlighted the value of organizing the website (and other program elements) based on key healthcare scenarios, aligning and prioritizing resources and inviting specific modes of action that were most important in each scenario, and enabling relevant "cross-scenario" awareness

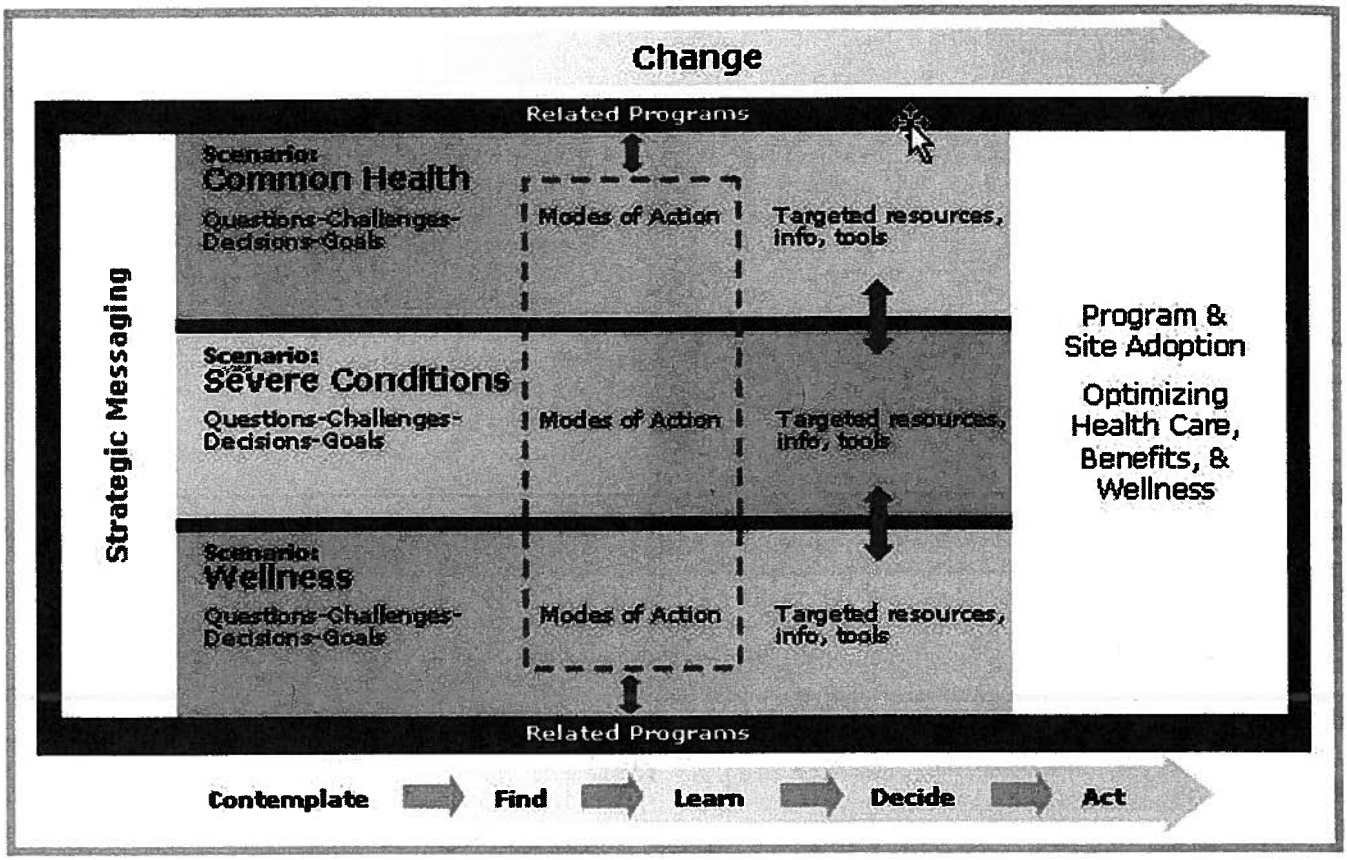


FIGURE 50.7. Scenario-based design framework.

and behavior that would provide value to users and support program objectives (e.g., a person who came to the website to learn about current research findings on the effectiveness of an experimental treatment for diabetes, might also be invited to explore the value of changes in diet or exercise to manage diabetes, etc.). In addition, the framework highlighted the importance of embedding strategic messages regarding healthcare (e.g., importance of evidence-based medicine, proactively taking charge of one's health and healthcare, etc.) and implicit invitations to change healthcare behaviors throughout the site design.

The ethnographic research led the team to rethink a number of major assumptions, which in turn led to redesign of program strategies, resources, and the website. From a program perspective, the research highlighted the fact that the vast majority of employees had already adopted many consumer attitudes and behaviors and were leveraging a number of trusted health resources (in contrast to initial assumptions of limited "consumerism"). This led the team to reconsider the positioning of specific program resources, shift strategic messaging, and generate novel program strategies including behavioral "rewards" programs that supported proactive and preventative behaviors. The initial research inquiry also led the team to implement a continuous assessment program to continue to monitor program impact and changes in employee experiences and behaviors.

Case Study 2: Department of Highways

The headquarters of a state Department of Highways was the site for a collaborative research and design effort with engineers charged with the design of a bridge, scheduled for completion by the year 2002.[18] The project aimed to design an electronic document-management system that was informed by an understanding of the everyday requirements of engineering work at the Department of Highways. The project began with onsite interviews and observations of engineering practice, with a focus on the document-related work practices.

Based on an initial understanding of the document-management requirements of the work, as part of the design process several alternate paper-based document-coding forms were designed. After several iterations, a coding form was settled upon that was then incorporated into the electronic document management system, both as a form to be scanned into a document database and as a model for an online coding form. The

[18]For more on the project with the Department of Highways see Suchman (1999, 2000).

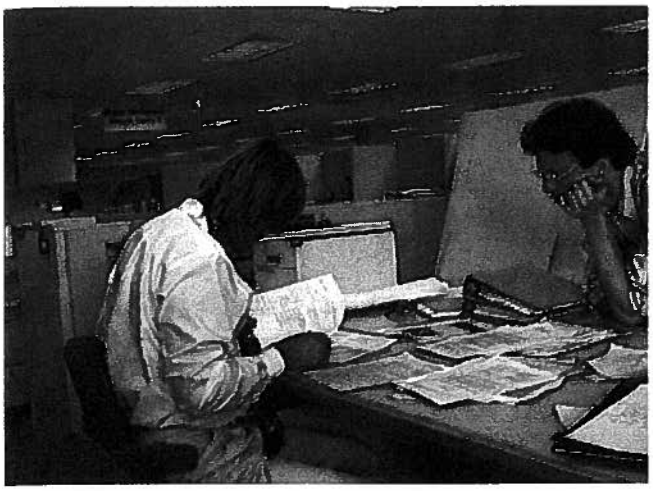


FIGURE 50.8. Engineer using mock-up of coding form to code documents.

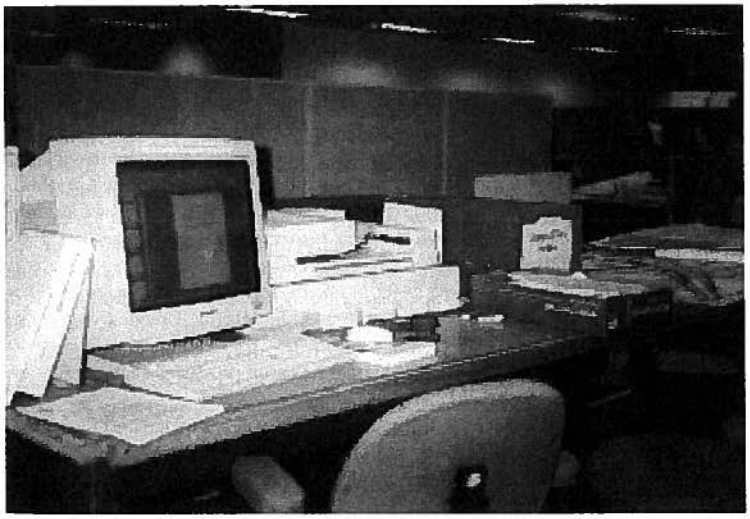
evolution of the coding form was informed by the prompted use of the form by engineers at the Department of Highways (Fig. 50.8).

One of the key insights that came from the ethnographic study was the need to design continuing connections between the digital and physical document worlds. This included locating familiar ways of organizing documents in the new electronic system, and taking advantage of visual memory in document search and browsing by displaying page images of the documents and not just the text (Fig. 50.9).

The insights gained from the ethnographic study also pointed to challenges that would face engineering teams adopting the new system. First, because members of project teams would no longer be the sole interface to the documents in the project files, team members would need to consider who might view the documents and for what purposes before deciding to add a document to the database. This was not necessary when the project files were paper-based because the physical location of the documents, in the engineering team's work area, restricted access. Electronic access now meant that users of the system could be located anywhere within the Department of Highways, making explicit access controls necessary. In addition, it would be crucial that an ongoing relation between the paper and digital document renderings be maintained as engineers found it most useful to work with the printouts of large engineering documents. The online renderings were not particularly useful by themselves. The research and design team was able to anticipate these work practice issues, make the highways engineers aware of them, and suggest possible ways they could be addressed.

CONCLUSION

Ethnographic studies have become an important tool for designers and development teams designing new information and communication technologies. Today in academic, institutional, and corporate settings there is the realization that understanding the everyday realities of people living and working in a wide range of environments and engaged in a myriad of activities is essential for creating technologies and services that provide



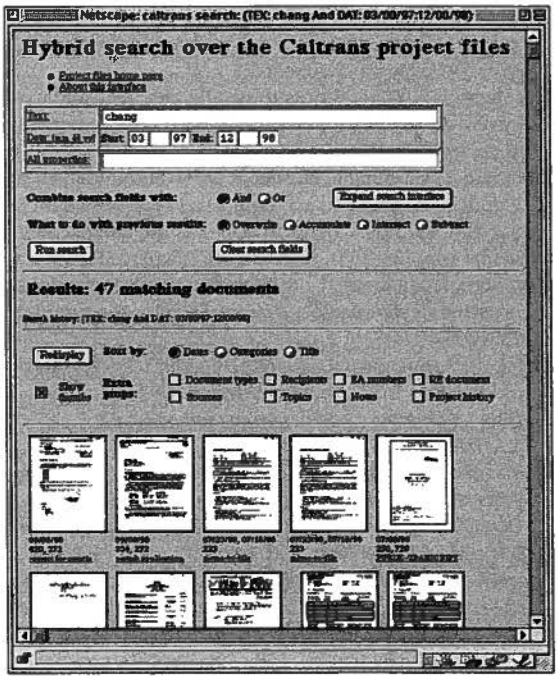


FIGURE 50.9. Components (document scanner, PC, coding forms, etc.) of the designed document management system and document search results page with thumbnails.

engaging and productive experiences for their users.[19] Emerging from recent research and practical experience is the recognition that representational tools (models, personas, scenarios, mock-ups and prototypes, etc.) and design-and-development practices (collaborative data analysis, video review sessions, etc.) are necessary for connecting ethnographic studies and technology design. Insights from ethnographic studies do not map directly onto design specifications or straightforwardly generate "user" requirements. Instead ethnographic studies must be connected and integrated with design agendas and practices. Those wishing to leverage the potential of ethnographic studies should not only understand what motivates the approach and is at its foundation (e.g., natural settings, holistic, descriptive, members' point of view), but also should recognize the importance of creating the conditions in which design can take advantage of ethnographic insights.

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