Rapid Ethnography: Time Deepening Strategies for HCI Field Research

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ABSTRACT
Field research methods are useful in the many aspects of Human-Computer Interaction research, including gathering user requirements, understanding and developing user models, and new product evaluation and iterative design. Due to increasingly short product realization cycles, there has been growing interest in more time efficient methods, including rapid prototyping and various usability inspection techniques. This paper will introduce "rapid ethnography," which is a collection of field methods intended to provide a reasonable understanding of users and their activities given significant time pressures and limited time in the field. The core elements include limiting or constraining the research focus and scope, using key informants, capturing rich field data by using multiple observers and interactive observation techniques, and collaborative qualitative data analysis. A short case study illustrating the important characteristics of rapid ethnography will also be presented.

Keywords
ethnography, field research methods, user studies, qualitative methods.

1. INTRODUCTION
Ethnographic research methods have become increasingly popular in the field of human-computer interaction. These research methods have been used in the design of a great variety of products, including a workstation for diagnostic radiology [25], network applications software [31], photocopy products [30], and consumer software [14]. Furthermore, the use of these methods spans the product development life cycle from gathering customer requirements [10, 18] to field evaluation of new products and services [7].

While it has been argued that there is "no one method of ethnographic analysis" [13], there are common elements that are generally included in such a research approach. Ethnographic research typically includes: field work done in natural settings, the study of the large picture to provide a more complete context of activity, an objective perspective with rich descriptions of people, environments and interactions, and a bias toward understanding activities from the informants' perspective [6].

It has been argued that there has been a common misunderstanding among HCI professionals about the analytical nature of ethnographic research. While often misconstrued as simply a method of field data collection, ethnography is rather a form of analytic reportage, with the ethnographer acting as a translator or cultural broker between the group or culture under study and the reader [1]. As in any research paradigm, the researcher must make motivated choices about what to study, who to observe, what activities to record, and how to analyze and integrate the data into valuable insights.

The importance of ethnographic research in the design process has been well described by Blomberg and her colleagues [6]. These include providing designers with a richer understanding of the work settings and "context of use" for the artifacts that they design. Ethnographic methods also provide ways to elicit user requirements that would hard for typical users to articulate. And finally, this kind of user research helps designers understand the varied and complex interrelationships between individual users within and between work groups.

One of the biggest challenges facing HCI ethnographers is the demand to spend time in the field while matching the pace of ever-quickening product development cycles. Traditional ethnography is very time intensive. "Typically, ethnography will take place over a period of several months with at least the same amount of time spent in analysis and interpretations of the observations [3]." It most cases, it just isn't possible to spend months or even weeks in the field gathering data, and a similar amount of time understanding the field data. Nevertheless, the benefits of examining field situated user activity remains inviting.

One approach to meeting the increasing time demands has been called "quick and dirty" ethnography [12]. In this approach, fieldworkers undertook short focused studies to rapidly gain an understanding of the work setting. In addition, the field researchers referred back to previous studies of related settings in order to help provide greater design context for systems under development.

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New product researchers in a large software company recently advocated several timesaving research methods [2]. One technique was to replace open-ended interviews and observations with a "condensed ethnographic interview." This interviewing technique quickly moved the conversation from broad issues to specific process bottlenecks and benefits. A second technique was to use unattended (passive) video observation, which reduced actual field time for the researchers. It should be noted that while this reduced experimenter time in the field, it might have actually increased the overall project duration due to the increased video analysis time. And the final time saving technique was to actively engage the target users in a "interactive feature conceptualization" process. This technique helped to quickly identify and categorize user needs.

Researchers in disciplines other than HCI have also looked for variants of traditional ethnographic methods when faced with very demanding time constraints. For example, medical researchers have customized ethnographic methods in a formalized process called rapid assessment procedures (RAP) for public health services [29]. RAP includes key informant interviews, behavioral observation, and focus groups. It is further distinguished by the use of multi-disciplinary teams and multiple data collection methods [11].

In a review of several rapid assessment methods, Beebe [5] identified several significant attributes that differentiated these methods from traditional qualitative research. In the rapid assessment research programs a *team* of researchers participated in the research program, there was considerable interaction among members of the research team, and there was a significant emphasis on rapid production of results. Furthermore, other defining characteristics of rapid assessment methods included a system level perspective, triangulation of data collection (i. e., multiple data sources), and iterative data collection and analysis.

Many of the concepts from the rapid appraisal methods mentioned above are useful in a discussion of ethnographic methods for HCI professionals. Rapid ethnography, as described below, grew out of my personal field research experience on a number of different projects, and is based on three key ideas.

- First, narrow the focus of the field research appropriately before entering the field. Zoom in on the important activities. Use key informants such as community guides or liminal group members.
- Second, use multiple interactive observation techniques to increase the likelihood of discovering *exceptional* and useful user behavior.
- Third, use collaborative and computerized iterative data analyze methods.

It is hoped that these field research strategies will improve the usefulness of field research and collectively provide a richer field experience for a smaller amount of time in the field.

As product development cycles continue to shrink, the time famine experienced by HCI ethnographers will no doubt continue. Time deepening strategies, such as those described by Robinson and Godbey [26] enable people to achieve higher rates of *doing.* Examples of these time-deepening strategies include: increasing the *speed* of the activity, *substituting* a faster activity for a slower one, *multitasking* (perform more than one activity at a time), and more explicitly and precisely *managing* the use of time (activity time allotments). The strategies described in this paper are considered to be natural time-deepening strategies. As such, they as they allow a researcher to do more with a smaller unit of field time.

In this paper, each of these three field research strategies will be described in more detail. The benefits and tradeoffs involved will be highlighted. To illustrate the methods, a short case study will also be provided.

2. FOCUS AND KEY INFORMANTS

Traditional ethnographic research is often undertaken with what can be described as a very wide-angle research lens. Almost anything and everything that is observed in the field may prove to be valuable. Field notes are written to be generally *inclusive* of most observed activities since the significance of these events is indeterminate at the time of the note taking. New electronic recording technology makes digital photography and video and audio recordings increasingly easy. This ensures an even larger field data set to be mined back in the research lab.

There are several benefits of a wide-angle lens approach to fieldwork. It is often true that the researcher is unable to identify the important details when first immersed in the field site. Important patterns of behavior may only be identified after lots and lots of observation of a very broad set of activities. Furthermore, an extraordinarily rich archived data set provides the researcher with a valuable foundation for future research. Indeed, other researchers can return to the field data and glean new insights. A rich field data set can be augmented with subsequent field visits and longitudinal questions can be investigated.

The benefits of data breath and reuse notwithstanding, there are several reasons why using a wide-angle focus for applied ethnographic work is problematic. First, there is a lot of time and energy invested in observing and capturing data that ultimately proves to be neither interesting nor particularly useful to the design team. This necessarily implies an important opportunity cost. Time spent looking at the broad landscape is time that is not focused in the area of critical importance to a product design team. The vast quantity of data, compounded by hours and hours of video and audio records, makes finding patterns all the more difficult. While there may be nuggets of gold in the data, they are just too hard to mine. A final reason to considerable the appropriateness of a wide-angle lens is to consider the timeliness of the data. If the research question is time bounded, or the research problem is centered on a rapidly changing area of technology, then the shelf life of the data may be fairly short

The approach that is proposed here is to narrow the research question sufficiently so that the field data collection yields a preponderance of useful and actionable data. A telephoto lens is the metaphoric approach of greatest value to the corporate (or HCI) ethnographer. This suggests that the research question is sufficiently well defined and that the research team has a pretty good idea where to aim the camera.

Indeed, the research team must identify the general area of interest as well as specific questions to be answered by the fieldwork. This focus will direct what the research team attends to, the line of questioning and the nature of the informant interaction. A research focus that is shared by the field team helps to ensure a

common understanding of the research objectives and will help frame the subsequent field data analysis. As pointed out elsewhere, when an ethnographic researcher is in the field making observations, it is important to remember that it is a *motivated looking* [1].

In a discussion of the design of air traffic control system Bentley et al. [3] provided an excellent example of a very focused set of research questions for the ethnographer. For example, the design team very specifically needed to know what characteristics of the existing (manual) system should be automated, which activities should remain manual, and which activities should be replicated *without* change in an automated system.

As in any behavioral research, there are important decisions to be made about who is included (and excluded) in the research sample. Like many other aspects of research methodology, the background and historical biases of various research disciplines shape the researcher's outlook on these decisions. Even the terminology used to describe the research sample belies different research perspectives. For example, psychologists refer to *subjects*, HCI researchers talk about *users*, market researchers refer to *consumers* or *segments*, and anthropologists refer to *informants.*

One of the major goals in applied ethnographic research is to observe and understand interesting patterns or exceptional behavior and then to make practical use of that understanding. The sampling strategy should, therefore, aid the researcher identify such behaviors in a reasonably efficient manner. Several sampling strategies that may be especially useful are described here.

First, identify one or more informants to serve as a research "*field guide*." These guides should be people with access to a broad range of people and activities and be able to discuss in advance where interesting behaviors are most likely to be observed or where activities that reveal social tension are most likely to be found. Guides should be able to reduce observation time by helping the researchers know where (and when) to look. If you want to catch fish, it is nice to know where to find the local fishing spots.

Use of *liminal* informants is also a good idea. Liminal informants are considered to be fringe members of a group and are usually allowed to move freely about that group. Their prior interaction with the group is extremely valuable and can provide the corporate ethnographer with an interpretation of the events based on prior events or experience. While insiders are often no longer cognizant of their personal or group behavior the liminal informant remains aware of interesting patterns or unusual events.

A third strategy is to include *corporate* informants, who are employees of the researchers own organization. From many research perspectives, the insights of colleagues and field staff such as sales and service representative are often ignored or discounted because of an assumed bias. Yet, this group of field workers has a wealth of field experience, knowledge and insight about the ways in which work is really carried out, or what things really matter to consumers. Corporate informants are also able to help identify and enroll guides and liminal informants.

A final approach is to use fairly traditional *fringe* sampling techniques to identify informants that are likely to be most interesting. The selection criteria needs to be clear and the informant-recruiting plan well thought out. Finding fringe informants can be difficult, but not impossible. Pointers to interesting fringe people can often be found in the popular or trade press, in public industry forums or awards programs. Once found, fringe informants can often help to identify other interesting people in what is called a referral or snowball sampling procedure.

Another sampling shift in rapid ethnography is to plan at the onset to develop long-term informant relationships. The depth of insight into individual and group behavior is often a function of the depth of interaction or participation. It follows, therefore, that once a good informant relationship has been developed that the research dialogue should continue. The depth of understanding will continue to be great, and the time to achieve that understanding will be reduced because of the already developed informant relationship.

3. INTERACTIVE OBSERVATIONS

One of the defining characteristics of ethnographic research is that it is situated in the field. In a similar manner, rapid ethnography is grounded in a field setting(s) and the inclusion of a broad holistic conversation with informants. Several techniques are proposed here to "make the most" of the field time and to improve the field data collection.

One approach that is valuable is to have more than one researcher in the field at the same time. While there is always the chance that the presence of more than one researcher will be significantly more disruptive to the "natural" setting, there are several advantages. Multiple researchers in the field can split up and observe different activities or groups. Multiple researchers in the field are often required for international research to help with language and local cultural issues. And finally, multiple views of the same events can be turned into a richer representation and understand of the situation [20]. Discrepancies and gaps in understanding can be noted and resolved.

The limited time that is spent in the field in an applied research project can be maximized in a couple of ways. Judicious selection of the time sample can help raise the chances that interesting events will be observed. For example, in a field study of the use a new communications system, it was noted that Monday mornings has especially high communications activity. The field team very intentionally scheduled observation time for Monday mornings to get a better idea of the user activities. In a similar manner, the communications activity in many small businesses follows fairly predictable peak activity loads. One way to maximize learning is to spend time in the field to coincide with the activity peaks. In a recent study of an online community, the electronic activity logs were analyzed to determine the times of day and days of the week that were the most active [19]. A reasonable time-sampling strategy would be to use this information to optimally schedule on-site observations.

Another approach to more rapidly understand user behavior in the field is to use a more interactive research approach. One such approach, the "interactive feature conceptualization" technique, was mentioned above [2]. Other more interactive research approaches include structured interviews, activity walk-through(s), and contextual inquiry. Researchers at Intel used a flannel poster board with various objects that were positioned and moved by family members to help illustrate a typical day in a

home setting [17]. And finally, group elicitation techniques such as the Group Elicitation Method (GEM) [8] can be used in the field, with individuals or groups, to elicit informant representations of behavior.

One final way to maximize the learning from a field experience is for the researcher to participate in the activity of interest. More formally called "participant observation," this technique allows a richer understanding through personal experience. This may, in fact, be the best way to understand some of the affective issues surrounding various field activities.

4. COLLABORATIVE DATA ANALYSIS

Rapid data collection is of limited use to the corporate ethnographer if the data analysis still proceeds at the painstakingly slow rate that is typical of most qualitative research. There are two general approaches that can help the applied ethnographer: computer-assisted analysis and collaborative data analysis.

Computer assisted analysis allows exploration of the large amount of qualitative data by coding, searching, subsetting, and contrasting the data. There is an increasing number of analysis tools available to the qualitative which is designed specifically for text-based data (e.g., FolioViews™, and AskSAM™ [22]). This is useful for analysis of transcribed interviews, online discussion text, and field notes.

Other software is designed especially for images, audio and video. These analysis programs allow the researcher to explore and understand the qualitative data by filtering (searching and subsetting), conversion (annotation or coding), summarization (counting, subsetting), and visualization (comparisons, sequences, and relationships).

Both text and multimedia analysis tools will improve the time necessary for ethnographers to understand their field data. Sanderson and Fisher [27] have discussed one measure of the analysis time as the ratio of analysis time (AT) to sequence time (ST). The sequence time is a measure of the time of an audio or video sequence (i.e., raw field data). Better analysis tools will no doubt reduce the ratio and improve the yield on raw field data.

The second time saving approach is to use analytical processes developed to allow research teams to collaboratively understand their field data. Examples of analytical processes include cognitive mapping, pictorial story telling and scenario analysis. Each of these methods offers reasonably efficient data reduction and results in highly useful, visually rich re-representations of the field data. Furthermore, they emphasize holistic and collaborative analysis.

Cognitive mapping have been used extensively to analyze qualitative data [21]. Several variations of the basic process have been developed including causal modeling, influence diagramming, and concept mapping. In traditional cognitive mapping, a network of variables is developed and the causal relationships between variables are explicitly delineated. Cognitive mapping has been applied to both individuals and groups, and can be elicited from the user or generated to represent the understanding of the model from the researcher's perspective. The model is typically developed after all of the field data have been collected and some cross-observation meta-analysis has been completed.

Pictorial storytelling is a analytical process of understanding field data by re-representing the data in the form of a pictorial story. Analogies and metaphors are used to document the research teams rich understanding of user behavior that has accumulated from multiple observations in the field. These pictorial stores are also used to help communicate the field learning to the rest of the organization.

In scenario analysis, several "scenes" or related clusters of events are represented using images (i.e. photos) from the field site. These scenes have specific cast members (i.e. users or informants) and include a narrative of typical events from the field site. A group interactive scene analysis may then used to understand the scenario [9].

5. CASE STUDY

A project code-named "Thinking Spaces" was initiated to study how technology, particularly the use of the Internet, was changing the way people work and the ways in which they would conduct their business in the future. The goal was to develop an understanding of real customers solving real problems - around the world. An ethnographic approach was selected to discover and understand the nature of these changes.

The research plan included visits to 31 organizations during a three-month period. At each location, the survey team interviewed a principal manager, toured the facility and interviewed and observed various workers. The data collected for each location included interview notes, work process flowcharts, floor plans, and photographs of the work environment and work processes. Paper artifacts, such as forms, brochures, and other company publications, were also collected and electronic artifacts, such as web documents, were identified.

5.1 Focusing the Observation and Key Informants

Given the general objective of the research project, it could have been quite difficult narrowing the range of organizations to visit, determining what kinds of work activity to observe and deciding which informants would be most informative. We decided to visit businesses that were technological pioneers in the use of Internet technology. Our operational definition of a technology pioneer was a work group or organization that was using the Internet in a critical business function. Internet award recipients, trade news and business news articles, and referrals from other pioneers were all used to select candidate sites to visit. As a sampling strategy, this approach could be classified as a combination of *intensity* (information rich cases that intensely manifest the behaviors of interest) and a *snowball* or *chain* sampling (identification interesting cases from people who know people or organizations that are information rich).

Before a visit was scheduled we tried to determine who in the organization would be considered key informants. We looked for the mangers that were directly responsible for the critical Internet activity and frequently sought out the group web masters. Through these informants, we were often introduced to other key participants that involved in the Internet project.

The research team's observational antennae were tuned to three aspects of the work site. First, we were intensely interested in the uses of all forms of communication, including email, telephone, fax, voice mail, and web publishing. Second, we were interested

in the artifacts that were used to support the communications processes described above. And finally, we were interested in various aspects of the physical work environment. For example, our interest in physical office arrangements of work groups helped us to contrast (and contextualize) the separate space and status of an online versus traditional paper publishing group in a news organization.

5.2 Interactive observations

Throughout this project, we encouraged multiple observation viewpoints by the consistent use of two or three person field visit teams. The research teams frequently split up at an observation site in order to get a broader perspective. Specific topics of interests were informally assigned to individual observers, as were interview roles such as conversation recorder, and photographer.

Our research team engaged in participant observation in a couple of ways. After a visit to a news organization, we were invited to join an online discussion group of new reporters. We continued our study of this group of technology pioneers by observing their work discussion online [19].

Much of the focus of our research was on small teams using various Internet-supported forms of communication (e.g., web sites and email). To better understand the Internet technologies that our informants were using, we decided to use web-authoring tools and create a project web site in order to privately share and archive field notes among the research team. We experienced first-hand many of the problems that our informants had been describing to us.

In a separate but related study of Internet users, we used an activity-based approach to elicit important information [28]. In this case, informants created multi-color maps of the Internet based on their own experience. They also created a multi-color personal history graph of their Internet use, including the use of stamp icons to indicate emotional reaction to specific experiences. While the maps and timelines were quite varied in visual interest and information content, they were quite useful as a mechanism to engage the informants in a meaningful discussion of the topic of interest. An example of a personal history that was generated as part of an interactive interview can be seen in Figure 1.

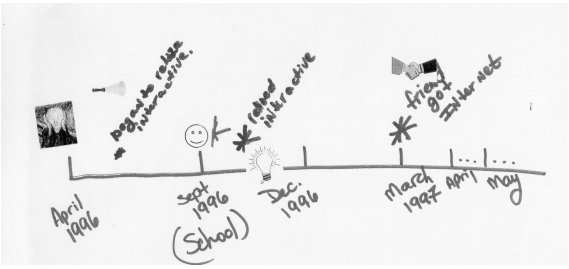

Figure 1. Example of personal history generated as part of an interactive interview.

5.3 Understanding Field Data

The multi-person observation approach was also extremely important in the process that we used to understand the field data. After each field visit, the research team documented the visit by answering a structured questionnaire. In addition, an informal causal model for the site was developed. In these models, we documented important contextual variables, such as organizational, industry or technological forces. We color-coded the model variable to help visualize the relationships between groups of people within the "system: (e.g., customers of the business, suppliers, or the customer's customers).

Although we found that generating each of the models was difficult, we quickly saw the benefits of the process. As we developed the models, we began to identify gaps in our learning. In some cases, we realized that our understanding of an activity needed additional input. Conversely, there were several times when we were surprised at the scope of our understanding. As we developed a particular causal model, we could easily draw upon concrete examples from our visit to illustrate the story. Indeed, developing the models forced us to document some important understanding that might otherwise have been forgotten. Figures 2 and 3 provide examples of the field-generated causal models.

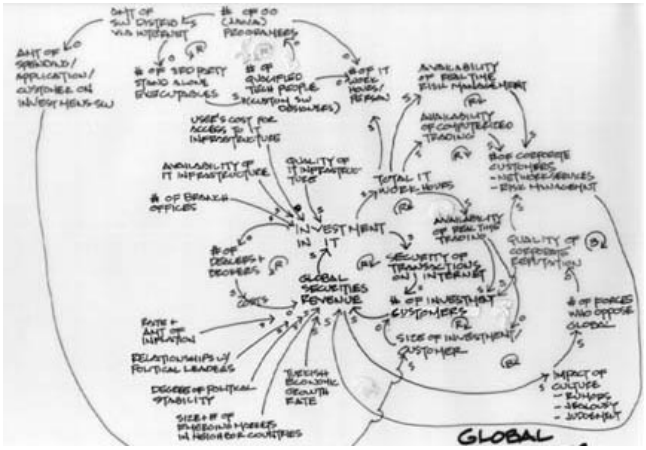

Figure 2. Example of a preliminary causal models.

It should be noted that the models are preliminary and necessarily incomplete. They were used to help the research team quickly begin to interpret what had been observed. This rapid shift from purely descriptive representation of our observations to preliminary analysis is consistent with the view of a more analytic view of ethnography that was discussed earlier [1].

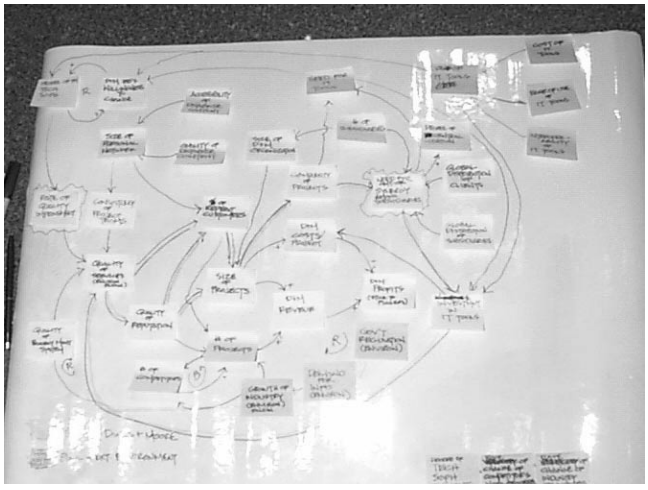

Figure 3. Example of causal model from the case study.

The field notes, both text documents and casual models, were analyzed later using qualitative analysis tools. FolioViews™ was used to code and sort the field text data in order to help identify recurring themes and to provide general content analysis of the

field notes. The hand-drawn causal models were re-rendered using a professional drawing package. Model summaries were abstracted and served as input to the composite, more general models that were developed.

6. SUMMARY AND RELATED WORK

The ever-increasing pace of new product development has been encouraging faster and more efficient HCI work processes. These new processes are designed to be faster and cheaper, without sacrificing the quality of the work. Of course, meeting both demands has been no small challenge.

There are several examples of *rapid* HCI methods. The most widely known would be the class of techniques that collectively support rapid prototyping of new interfaces.

Several rapid methods have been developed to help with the requirements gathering end of the development process. Examples include a simple, low-cost technique for task analysis called CUTA [15]. Similar to the CARDS procedure [23], CUTA helps speed requirement solicitation by identifying concrete work artifacts, actual workers, and then specifying the relationships and flows between them.

A method to streamline user modeling has also been proposed by Beard, Smith and Denelsbeck [4]. They have developed a "quick and dirty" GOMS modeling method in which the model is simplified and made more easily modifiable.

Rapid design tools have also been developed. For example, PICTIVE is a lightweight and quite well known method of developing screen-based user interfaces [23].

A final area of *rapid* processes can be found in the area of usability testing. The most popular of these evaluations methods include the cognitive walkthrough [16], and heuristic evaluation [24]. Both of these usability testing methods is intended to reduce the time and cost associated with traditional laboratory user testing, while providing quality usability results.

Undoubtedly, the use of ethnographic methods in various parts of HCI work will continue to grow. Understanding the context of the user environment and interaction is increasingly recognized as a key to new product/service innovation and good product design. Undoubtedly, the time pressures and constraints for HCI design teams will continue to increase. Practical use of ethnographic methods, therefore, depends on whether the methods can be adapted successfully to provide useful information in a timely fashion.

Rapid ethnography is an evolving set of field practices that will allow an HCI team to better understand users, the user environments, the interaction between the two -- in a shortened timeframe. This is accomplished through more focused observation, better selection of informants, multi-person research teams with greater informant interaction and better data analysis tools.

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