Main Article:

Exploring Forms of Triangulation to Facilitate Collaborative Research Practice: Reflections From a Multidisciplinary Research Group

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Abstract

This article contains critical reflections of a multidisciplinary research group studying the human and technological dynamics around some newly offered electronic services in a specific rural area of Finland. For their research, the group adopted ethnography. On facing the challenges of doing ethnographic research in a multidisciplinary setting, the group evolved its own breed of research practice based on multiple forms of triangulation. This implied the use of multiple data sources, methods, theories, and researchers, in different combinations. One of the outcomes of the work is a model for collaborative research. It highlights, among others, the importance of creating a climate for collaboration within the research group and following a process of individual and collaborative writing to achieve the potential benefits of such research. The article also identifies a set of remaining challenges relevant to collaborative research.

This article is based on the experience of our own research group, eHAT (electronic Business: Human Aspect to Technology). It is a multidisciplinary research group in Finland, studying how new electronic services are being incorporated into the daily lives of the users and how that process shapes the ongoing development of such services.

We start with an introduction to the eHAT research group and the methodological perspective adopted in the group's research work. We then focus on some of the challenges encountered in implementing our methodological perspective within the multidisciplinary setting of our research group. Next, we present our response to these challenges which we have been developing systematically in the form of *collaborative ethnography*, in which we make use of four different forms of *triangulation* as a key feature of our research practice. In the subsequent parts of the article, we present some critical reflections on our own research practice and draw out a model for collaborative research that may be of interest to researchers in other contexts. Finally, we identify some remaining challenges relevant to collaborative research.

1. eHAT Research Group

The eHAT research group was located in a rural area of Finland. The objective was to study the villagers' use of new services based on information and communication technology (ICT). In April 2003, the group started with a female leader, two female researchers, and two male researchers. A year later, one more female researcher joined the group. Ever since the beginning of the group, different disciplinary and professional backgrounds have been represented: information systems, consumer studies, and social anthropology. Of its various members, only one of the researchers lived in the study area.

As the research required us to develop an understanding of the users' daily lives and the place of the new electronic services in their lives, *ethnography* became our preferred research perspective. Ethnography is a method for studying shared practices in community settings. It is a relatively well-known approach in social anthropology. It has also been used by researchers in the information systems field to study ICT related practices in organisational settings. Even though the first ethnographic studies in the information systems field are over 20 years old (e.g., Orlikowski, 1991; Wynn, 1991), it is still not a widely known research approach in this field.

Ethnographic studies focus on the production and reproduction of everyday life by often "othered" people, revealing meaning, social structure, power relations, and history (Lather, 2001, p. 481). In such studies, the researcher spends a long time at a research site and gathers data from many sources. In the analysis process, the researcher makes a distinction between *presentational data* (what the informants say they are doing) and *operational data* (what the informants are actually doing), and explains the situation using some conceptual understanding (van Maanen, 1979).

So there we were, a multidisciplinary group, trying to do an ethnographic study together, despite our differences in the disciplinary, professional, and perhaps personal orientations. This led to a number of challenges for us, as described below.

2. Challenges Encountered

The challenges emanated from the diversity within the research group. The group was diverse in many respects. There were of course the differences in disciplinary and professional backgrounds. In addition, as we discovered gradually, the differences in our familiarity and closeness to the communities we were trying to study, differences in our ability to listen beyond what is said in interviews, and differences in the degree of our acceptability as competent researchers were also relevant.

In ethnography, an attempt is made to draw out concepts and issues from a local situation, rather than introducing concepts and issues identified previously from the literature or from another situation (Deetz, 1996). Therefore, ethnographers focus on the informants' narrations, i.e., the ways they describe their lives. In interpreting informants' narrations, researchers use their own knowledge to choose the interesting parts of narrations and rewrite them (Emerson, Fretz, & Shaw, 2001; Eriksen, 2001). Naturally, researchers with different knowledge bases are likely to draw out different concepts and issues from the same narrations.

Ethnographic research starts with *fieldwork,* gathering local narrations and practices usually through the method of *participant observation*. Participant observation amounts to gaining access to a new social world and producing written accounts, i.e., field notes and research articles, which make versions of this world accessible to others. Field notes are inevitably selective. The ethnographer writes about certain things that seem significant, often ignoring, and hence omitting, other matters that do not seem equally significant. Also, the same events and objects can be written about in different ways, due to the active process of interpretation and sense-making by the writer (Emerson, Fretz, & Shaw, 2001). "What we call our data are really our own constructions of other people's constructions of what they and their compatriots are up to" (Geertz, 1973, p. 9). So, researchers with different disciplinary and professional backgrounds are likely to produce different field notes while working on the same ethnographic project.

Interviews are an essential part of ethnography. The interviewer empowers the informants by listening carefully and respectfully, allowing the informants to name the world (and its constituents) in their own terms. An ethnographic interview requires respectful listening, which means listening for shifts in verbal inflection, contradictions, topics avoided, and hesitations. Furthermore, researchers are also required to take note of the broader context than that of the interview itself. Therefore, ethnographers should have adequate knowledge of the social conditions in which people live (Heyl, 2001). Of course, researchers with different listening abilities and different degrees of familiarity with the social conditions would produce different interview outcomes.

There is also a view in the social research literature that the quality of ethnographic data may depend upon how "natural" the researcher's presence is considered to be by the residents of the study area (e.g., Eriksen, 2001). As mentioned earlier, only one of the members of our research group lived in the study area. So, different members' presence could not be perceived to be natural to the same degree.

The above challenges indicate the uncertainty associated with the ethnographic research process and the quality of its results. To address this issue of uncertainty, Klein and Myers (1999) have proposed seven principles to guide this kind of research. The seven principles are: (a) fundamental principle of the hermeneutic circle, (b) principle of contextualisation, (c) principle of interaction between the researchers and the subjects, (d) principle of abstraction and generalisation, (e) principle of dialogical reasoning, (f) principle of multiple interpretations, and (g) principle of suspicion. In brief, the principles require that researchers should become aware of the complex processes through which meanings get constructed in this kind of research and the numerous pitfalls therein. The principles also indicate the types of care researchers ought to exercise in order to produce more defensible results.

Taking a cue from the above principles and the methodological work of Deetz (1996), we chose to view our disciplinary and other diversities as a potential strength, rather than a weakness. Deetz speaks of two alternative targets for social research. One possible target is to reach a consensus in describing a prevailing set of identities, social relations, and structuring of actions and experiences. Another possible target is to challenge the prevailing set by presenting alternative interpretations (Deetz, 1996). Ethnography lends itself well to both these research targets. It occurred to us that we might seek to achieve both these targets systematically, by making use of the diversities available within our group. In this way, we hoped to convert what initially seemed like a predicament into a resource for us to move ahead in our research project. This was a path we had to chart by inventing new methods of working as we progressed through the project.

3. Our Response: Collaborative Ethnography

Ethnography is described as a method for individual researchers (e.g., Myers, 1999); even a jazz soloist has been used as a metaphor for the ethnographer (Humphreys, Brown, & Hatch, 2003). However, our solution to undertake collaborative ethnography is not unique (see, for example, Belgrave & Smith, 1995). One of the pioneers in using ethnography in the information system field is Barley (1996), who also used collaborative forms of ethnographic research. He had several researchers, mainly students, each of whom studied an occupation. The group, however, had collaborative tasks--team meetings in which they discussed the fieldwork, analysis methods, and the occupations under study (Barley, 1996). Another remarkable precursor is the team of O'Connor. They had a multidisciplinary research team collaboratively studying organisational work practices (O'Connor, Rice, Peters, & Veryzer, 2003).

Anthropology also has a long tradition of collaborative ethnographic fieldwork. Especially when fieldwork periods lasted uninterrupted for at least a year, it was common for couples to go together. This has been done by couples who are either both anthropologists (see, for example, Strathern, A., 1982; Strathern, M., 1988) or one of whom is an anthropologist (Cohen, A., 1988) and the other is not (Cohen, B. J., 1983).

Although collaborative ethnography has been done earlier, conducting it has not been easy. Barley (1996), for example, reports that their group worked collaboratively on only one task. In other cases too, collaboration has been found to be difficult and the

anticipated multidimensional accounts have not been achieved. Sometimes, the members of a research group remain rather bounded by their individual specialities and fail to establish a dialogue (e.g., Tiainen, 2004). Furthermore, there are generally power differences among the members, by virtue of their professional status (for example, the higher status accorded to technologists in information-systems related projects, see Greenbaum & Kyng, 1991) or their roles in the group (for example, the leader being more powerful). There can also be differences in values and ideals, which can cause critical problems, especially in the absence of awareness and resolution of these differences (Davidson, Schofield, & Stock, 2001).

However, having decided to follow the path of collaborative ethnography, we had to devise a process to manage the diversity and facilitate the research group's functioning. Figure 1 depicts the cyclic process we followed. The starting point is individual conceptions about how our research is to be done. These conceptions are based on our disciplinary backgrounds and prior experiences. We produced individual write-ups on structuring our collaborative research work, taking care to keep the write-ups as independent as possible. The write-ups were used as material for further analysis and reflection in the group. This included the following steps: (a) collaborative writing of a first draft representing our research practice, (b) group discussions around this draft, and (c) rethinking of our research practice and revision of the draft (which later became the basis for the present article). Of course, the process was far messier and rather emergent in nature, than the diagram (Figure 1) would suggest.
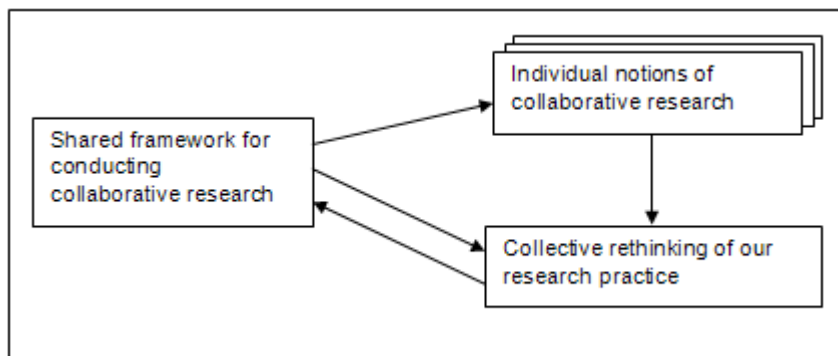

Figure 1. Evolving a shared framework for collaborative research in the eHAT research group.

As might be expected, managing the diversity within the group vis-à-vis the ethnographic process was a key issue in the shared framework we evolved. Our approach to managing this diversity centred on the notion of *triangulation,* especially on using multiple forms of triangulation within the same research project. The next section presents an account of this approach.

4. Exploring Multiple Forms of Triangulation

The word *triangulation* has different meanings in different disciplinary and professional contexts. It is a well known technique among surveyors, used for measuring distances and

angles over rough terrains and/or long distances. The notion is used somewhat metaphorically in the context of social research, to signify the use of two or more methods to check if they yield the same result.

In ethnographic research in particular, the purpose of triangulation would be to use two or more comparable processes within research to enhance the comprehensiveness of data, to contextualise the interpretations, and to explore a variety of similar and dissimilar viewpoints. This means that researchers observe as many parts of the social setting, and as many persons and roles, as possible (Rock, 2001, p. 34).

In social research, there is no guarantee that informants would always know and tell the complete truth. Informants may be aware of certain issues; besides, they may also lie, evade, and otherwise deceive the researcher. It is important that researchers recognise which statements or reports might be misleading (Järvinen, 2004, pp. 87-93) and would require further qualification.

> The informant cannot offer more than a single, embedded perspective on the complexities of the world, his or her account will be situated, limited and motivated, and it will always have to be qualified by conditions as yet unimagined.... One must search out others for a qualifying perspective. (Rock, 2001, p. 34)

In interviews where people make sense and explain their lives, it is not relevant to ponder if they are telling the whole truth, as some topics may not be available for discussion. For example, in describing their life stories, people also *reconstruct* them. When the same person describes his/her life, parts of the description are usually stable, i.e., often presented in similar ways, but other parts may be new every time (Siikala, 1984). Furthermore, the interview situation affects what people say and how they say it. The influence comes partly from the expectations of what an interview situation is and how one is expected to behave in it. The relationship between the interviewer and the informant also influences the situation and therefore also the gathered data (Briggs, 1986). This shows how research is not really independent of people; both researchers and informants affect the process and the results. This calls for forms of triangulation, for example, where different researchers would interview the same person.

Indeed, different forms of triangulation have been discussed in the social research literature to address the above issues. Among them are schemes that make use of different data sources, different methods of data gathering and analysis, different theoretical frameworks to make sense of the findings, and also different researchers doing similar tasks (Denzin, 1975, p. 301).

We found that using these different forms of triangulation, especially the use of different researchers and different theoretical frameworks, gave us a way to convert our research group's diversity into a significant strength. It helped us avoid imposing any particular interpretation on a set of phenomena which were multifaceted, flowing, and evolving.

4.1. Multiple Data Sources

In our study of the villagers' ICT use, data were gathered from public documents, interviews, participatory observations, and trial use of technical artefacts. Public documents included the following: official statistics, municipal annual reports, local newspapers, and village Internet sites. About 60 open-ended interviews, conducted in 2003 and 2004, were a major source of data. We first interviewed active villagers (e.g., members of the village residents' association) and the owners of local enterprises. We also asked them about other possible informants whom we contacted later.

Participant observation was made and field notes were taken by one researcher who participated in some local activities, such as village events and voluntary work in a computer workshop. Moreover, almost all the interviews happened in informants' homes, which gave us a chance to see the informants' living contexts. Artefact trials were also conducted in informants' homes. The prototypes of Web and mobile services were used to evaluate future electronic services. When we started it, we were not sure if it would yield any useful empirical material. However, it gave us a good chance to discuss with informants about their everyday ICT use, amounting to supplementary interview material.

Our research group collected a diverse range of material from several different sources. The collected empirical material contained many apparently contradictory views.

4.2. Multiple Methods

As discussed above, we made use of several data gathering methods--broadly speaking, participant observation and ethnographic interviews. We also collected some quantitative data, primarily as background information on the village.

For analysing the data, we used *discourse analysis* and *phenomenography*. The specific insights form these would be the subject matter for another article. For the present purpose, suffices it to state that these methods were sufficiently different from each other to serve as independent qualifying perspectives, fulfilling the aim of triangulation.

4.3. Multiple Theories

Our research group is located in a department of computer sciences and the group leader is a professor of information systems. Somehow, the field of information systems appears to maintain a rather limited view of the human being (Adam, Howcroft, & Richardson, 2004; Isomäki, 2002). People are seen in relation to technology; they are called *users* (Greenbaum & Kyng, 1991). Of course, some human issues, such as trust in electronic commerce, have also been discussed in the information systems journals (e.g., Gefen, Karahanna, & Straub, 2003; McKnight, Choudhury, & Kacmar, 2002).

Another group member had a background in consumer studies. This field affords a wider view of human beings by focusing on their experiences, motivations, behaviours, and attitudes (Joines, Scherer, & Scheufele, 2003; Kau, Tang, & Ghose, 2003).

Yet another member had a background in social anthropology. Social anthropology is concerned with knowledge about humans in societies. The main focus is on the diversity of social life (Eriksen, 2001, pp. 2-5). Anthropologists have also studied technology, including ICT (e.g., Christensen, 2003; Miller & Slater, 2000).

Thus, we tried several theoretical concepts to grapple with the situation in the field. We analysed people's role in technological developments by using the frameworks of *social shaping of technology* (Bijker, 1995), *diffusion of innovations* (Rogers, 1995), and *ICT domestication* (Lie & Sorenson, 1996; Silverstone & Hirsch, 1992). The different theoretical concepts helped us appreciate the situation in the field from different perspectives. This also led to interesting results. For example, we produced a revised version of the domestication theory, augmenting it with the concepts of community and social practice, taking these latter elements from the theory of diffusion of innovations.

4.4. Multiple Researchers

The individual researcher plays a key role in ethnographic research. In anthropology, where ethnography is an established research paradigm, the distinction between the researcher and the research instrument tends to blur. "The anthropologist him- or herself is the most important 'scientific instrument' used, investing a great deal of his or her own personality in the process" (Eriksen, 2001, p. 26). The ethnographer's own understandings are usually reflected in the research results. "The ethnographer's own taken-for-granted understandings of the social world are tied closely to the nature and quality of the data produced" (Järvinen, 2004, p. 91). Due to the bias caused by personal biography, ethnographers may see only those parts of social reality that make sense in terms of their earlier experiences (Eriksen, 2001, p. 28).

Although the above indicates the importance of involving multiple researchers, there is no reason to suppose that the individual biases of researchers would always cancel each other. It is possible that the biases of each researcher might amplify those of the others (Thurmond, 2001).

In our project, we had several researchers doing the same task. We did this in both data gathering and data analysis. First we describe our collaborative data gathering. The aim in the interviews was to collect villagers' narratives concerning their ICT use. We conveyed our intent by an open call in a local newspaper seeking volunteers for interviews. We made contact with the villagers in the meetings of the residents' association, using the snowball sampling method, i.e., asking our initial interviewees to tell us who else should be interviewed.

We conducted some collaborative interviews. These included two researchers interviewing one informant together and two researchers interviewing different members of a family at the same time. In the designing the interviews, we tried to decrease the researcher bias and overcome the problem of *limited skilfulness* (Thurmond, 2001).

Collaborative interviews also proved useful for other reasons. One young female researcher's first contact with a potential informant at the latter's home was very

unpleasant. Afterwards, she preferred only public places for interviewing persons she did not know. But, as we wanted to gather information on villagers' living contexts, we decided that she would conduct the home interviews together with another researcher. The solution was very revealing for us, since the informants acted very differently towards the two researchers in the interviewing situation: they ignored the researcher who was in her mid-twenties and discussed mostly with the other researcher, either a man in his late-twenties or a woman in her mid-thirties. This can be understood by the general image of professionals, which seemed to be connected to the categories of age and gender.

One of the researchers, a woman with a background in information systems, refused to interview male villagers because of her earlier experience of men's attempt to challenge her expertise. She found it easier to interview women, since they did not try to dominate her. Most of the men were interviewed by an anthropologist who did not mind if her technical expertise was underestimated; instead she found that she got detailed answers when the men wanted to teach her.

The research group acted flexibly and the practices were constantly under revision. There was no need to compel the researchers to work in a way which they found unpleasant. Instead, as we understood the role of the researcher to be "the most important 'scientific instrument' used" (Eriksen, 2001, p. 26), we wanted to create conditions in which these "scientific instruments" could work as effectively as possible.

Following Alvesson (2003), three major elements in interviewing can be changed by design: (a) the individual interviewee(s), (b) the social scene of the interview situation, and (c) the linguistic structure that guides the interview. We chose interviewees as per our plan, but sometimes we changed the social scene of the interview situation by adding another interviewer with a different disciplinary background. We also explored different linguistic structures through different interviewers, where the language changed from technical to non-technical.

In order to become aware of our individual biases and to manage the same effectively, we put some effort into making a community of our research group. We held seminars for the group in order to create a shared knowledge base. We also spent leisure time together to get to know each other better and to learn to respect each other as individuals. Gradually, the group focused more on discussing and writing. Discussions usually focused on different interpretations of the data, often producing rethinking and restructuring of the empirical material.

Writing by members made their interpretations visible and discussable. Writing often progressed iteratively. The initial writings were the field notes. Members also wrote working papers individually, based on their own material. Some co-authored conference papers came subsequently.

5. Model for Collaborative Research Practice

We now present a model for collaborative research, based on the explorations of our multidisciplinary research group. In the model, individual and collaborative phases alternate. The aim of the individual phase is to focus on an individual researcher's own experiences and interpretations, whereas the aim of the collaborative phase is shared understanding. The model includes three phases (see Table 1), which are described below in detail.

Table 1. *Model for Collaborative Research*

Phase	Aim	Individual Tasks	Collaborative Tasks
1. Forming a Collaborative Base	Framework	• Looking at the research problem within one's own discipline	• Forming a collaborative framework
2. Data Gathering	Data	• Collecting documents • Participatory observations • Interviews • Artefact trials	• Possible: collective interviews
	Field notes	• Writing field notes • Analysis of field notes	
3. Collaborative Analysis	Working papers	• Writing working papers	• Collective writing based on individual working papers
	Final papers	• Reanalysis of the data • Writing individual papers	• Reanalysis of the data • Writing collective papers

5.1. Forming a Collaborative Base

In this initial phase, a shared conceptual foundation and a social context for collaboration are created for the group. Creating the shared conceptual foundation includes reading the available literature on the phenomenon being studied and some selected theoretical literature from all the disciplines and fields represented in the group. This enables members to learn each other's language of research. Selecting the relevant literature is an important task. We used our research networks to reach outsiders, for example, visitors to our research group seminars, to help us in this task. It is important not to ignore or marginalise any of the members or disciplinary perspectives available.

Creating the appropriate social context involves many aspects. An informal community facilitates this process. It requires the members to know each other by spending time together. In our case, only one group member lived in the study area; so the others sometimes stayed at her house.

Physical places may also be important in creating the social context. The eHAT group's institutional location is at South Ostrobothnia, Finland. The fieldwork was done there. South Ostrobothnia is a physical place, but it also became a *social space* for us. Using a

distinction made by Wise (1997, p. 124), it was our *practised place,* in which our activities created a social space for us.

Of course collaboration can and does happen from remote locations, as we experienced when two of our members temporary lived abroad. During that time, our social space was mentally located at South Ostrobothnia. The group members used computer technology, such as e-mail and the video-conferencing, to overcome the distance. Still, we benefited from our connection to a physical place, of which everyone had experiences and shared memories.

The essential part is to generate a climate for collaboration, for team members to share and shape each other's ideas. Of course, team members' will and skill to *make* their own perspectives and *take* others' perspectives into account would be important in this phase (Boland & Tenkasi, 1995).

5.2. Data Gathering

This phase focuses on individual tasks, although some collaborative tasks are also possible. The shared conceptual foundation becomes the basis for individuals' own data gathering activities, which may be altered with additional conceptual resources. Data gathering can include data from different sources, using multiple methods, some of which might be employed collectively with other researchers. However, the phase includes a number of individual tasks, as presented in Table 1.

Some initial analysis also happens during data gathering, for example while deciding upon the events or issues interviewees would be asked to elaborate, or the items to be written in the field notes. This also involves some collective processes, such as sharing of fieldwork experiences within the research group.

In this phase, individual researchers write field notes and working papers. Through such writing, one develops and shapes one's own interpretations and analysis of the empirical material. When the ideas and interpretations are in a written form, it becomes easier to seek others' comments.

5.3. Collaborative Analysis

This phase focuses on shaping the collective result. Conceptually, a distinction can be made between two broad classes of collective result: an objectively codified *knowledge warehouse* and knowledge held together in a *community of knowledge* (Wong & Tiainen, 2005). In our case, the latter type of collective result was more relevant.

Collaborative analysis involves reanalysing the collected data in the light of multiple theoretical frameworks. In our case, this has led to questioning the ways of articulating one's own ICT use (for details see, Hynes, Tiainen, Koivunen, & Paakki, 2006). Another result is the model for collaborative ethnography presented here.

6. Remaining Challenges

Three such challenges merit our attention: (a) individual researchers' aptitude, (b) choice of initial theoretical frameworks, and (c) politics of exclusion in collaborative research. These issues are outlined below.

The collaborative research group gets its results based on the work of individuals. The individual members need to read the literature of their own disciplines and defend the same against other conceptions. They also need to be ready to take others' perspectives into account and create a new shared understanding. The collaborative process needs, on the one hand, flexibility for understanding others and, on the other hand, firmness and confidence in relation to one's own background.

Working with multiple theoretical frameworks can be confusing, exhausting, and inconclusive (Thurmond, 2001). Merits and demerits of starting with a relatively similar or dissimilar set of theoretical frameworks can only be assessed in specific instances.

Despite a shared understanding emerging, alternative interpretations may still be held by some individual members holding sufficiently different perspectives, i.e., the "others" (Riggins, 1997). In our research group, the anthropologist and the consumer researcher could be located in that position. However, we worked actively to avoid power differences and the possible neglect of any member's knowledge and expertise.

Acknowledgements

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