

The Sociality of Fieldwork: Designing for Social Science Research Practice and Collaboration

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ABSTRACT

Supporting scientific practice has been a longstanding goal of CSCW research. This paper explores how we might design for social science research practices and collaboration. Drawing on sixteen interviews with fieldwork-based social scientists we document the importance of small-scale long-term collaborative arrangements for research and intellectual work - pairs of researchers who work together in-depth over their careers, developing a common yet distinctive view of their research field. This contrasts with the large-scale short-lived collaborations that have classically been the target of cyber-infrastructure work. We describe technology practices among social scientists and how these can inform technology design for fieldwork practices.

Categories and Subject Descriptors

H.4.0 [Information Systems]: Information Systems Applications: General

General Terms

Human Factors.

Keywords

Cyber-infrastructure, e-social science, fieldwork

1. INTRODUCTION

One of the major uses of group technologies is collaborative science and research; the emerging programs of cyber-infrastructure and e-social science are testament to an increasing use of these technologies for science [13, 20]. But where much research within these programs looks at large collaboration structures, less attention has been paid to the smaller tight-knit collaborations that are part of particularly social science research. This lack of attention by researchers might be explained by most social science research being undertaken by small groups of individuals, even single individuals, who perform work that is conducted using generic ad-hoc technologies (such as email, internet information search and word processing), using well-established methods. The reflection of this process has so far been expressed through literature analyses, co-authorship evaluation [17] and quantitative project evaluations with clear success criteria [22, 31]. Particularly small-scale field-work research has received little attention, possibly due to its perceived utilization of generic technology use (“office technologies”) but also its

diversity in approach. How is it even possible to group social science fieldworkers as one type of technology users? In this paper we take a first step towards analyzing social science fieldwork from an inclusive but detailed perspective. We look at the detailed collaborations and collaboration technologies for the tight-knit social scientists that conduct fieldwork; although this group seem broadly defined, we find that these researchers have much in common and that addressing technology utilization is a productive step in the direction of designing and implementing future technologies for e-social science. Small-scale fieldwork is just as important to explore as the large-scale cyberinfrastructure research.

We present interview data with a set of sixteen social scientists, describing how these social scientists collaborate, collect data, conduct analysis and work together on publications. While the social sciences span a huge diversity of different approaches and methods, we focus here on scientists who use field methods of one shape or form – collecting empirical data in the home environments of those being studied. The researchers we studied span sociology, criminology, drug policy, education and social psychology, draw on quantitative and qualitative methods, as well as spanning a range of distinct theoretical and disciplinary commitments.

Focusing on the researchers’ fieldwork practices and their technology use, it was reaffirmed how the close-knit collaborations were of essence. This contrasts with those who have argued for an increase in the scale of social science; for example, Atkins et al. [2] argue that “social science research is on the verge of being transformed through distributed global collaborations, the use of very large data collections, tera-scale computing resources, and high performance visualization”. To the social scientists we studied these “tera-scale computing resources” were on the whole irrelevant. The collaborations that were most important to them were much smaller groups of two or three researchers working together over long periods of time - career-long in many cases. These collaborations were often conducted over a distance, yet researchers still formed a distinctive joint worldview and analytic approach. What is key to the collaborative practices is how social science researchers become tied together with distinct theoretical commitments and worldviews.

2. LITERATURE

The Internet has greatly increased the possibilities for collaboration between scientists, witnessed by an increase of co-authorship in many disciplines [38]. Research shows that the increasing use of computer-mediated communication can lead to higher scientific productivity [37, 42] and ‘cyber-infrastructures’ more generally have been shown to facilitate geographically dispersed research. However, much current research on cyber-infrastructure has been dominated by the natural sciences [36]. While grid computing, shared access to computational models, or

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GROUP’12, October 27–31, 2012, Sanibel Island, Florida, USA.
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very large data sets, do have major applications to some parts of the social sciences, much social science research tackles quite distinct research problems that render these systems inappropriate [10]. The emerging program of e-social science, or ‘e-research’ has developed to address the distinctive problems of social science research [3]. While acknowledging the great diversity within the social sciences, social science research frequently deals with relatively small sets of data, theoretical explorations, activist engagements, and a long term commitment to investigating from interpretivist, or at least non-positivist, traditions [16, 26, 41]. For these social scientists their work problems and potential use of cyber-infrastructure are distinctly different from the concerns of ‘big science’. The study of many complex activities - such as learning or language socialization - involves collaboration that is seldom reducible to sharing raw data, but rather a complex process of ‘coming to see’ the world in common [6, 18, 19]. These practices demand distinctive collaborative tools, tools built from an understanding of the intellectual and collaborative processes involved.

Indeed, a number of recent critiques have argued that current cyber-infrastructure work has been dominated by technology [3], and that there has been insufficient consideration of the nature of scientific work [22], conditions of technology use [23], and system usability [35, 36]. As David [10] pointed out: “engineering breakthroughs alone will not be enough to achieve the outcomes envisaged for these undertakings. Success in realizing the potential of ‘e-research’ and ‘cyber-infrastructure’ will more likely be the resultant of a nexus of interrelated social, legal and technical transformations”. These issues come particularly to the fore when considering the social sciences.

Studies of scientific practice are most strongly exemplified by work in science and technology studies. However only recently has attention been paid to studying the work of the social sciences. Notable here is Porter’s work on statistics and discussions of reflexivity and social science practice [15, 32, 36]. Recently studies of economics, and the relationships between its intellectual concepts and the behavior of markets [7, 27, 28] have gained prominence, alongside studies of interaction in interviews and survey settings, and the related questions of standardization in social science survey research [29, 30].

Within CSCW there has been growing interest in examining and designing for the work of scientists [5, 9, 13, 25]. Our field has a particularly powerful position here, drawing on the tradition of studying the practice of difficult to understand, complex work situations, and using those studies to produce rich design interventions. This has motivated work on how cyber-infrastructure can support new data collection techniques, such as instant messaging [39], phone based experience sampling [8], or electronic laboratory notebooks. One system of note is Butterflynet [42], which allowed field biologists to share and augment paper-based field-notes.

In Europe a number of researchers have also taken the lead in developing ‘e-Infrastructure’ research, drawing on ethnographic approaches to cyber-infrastructure [20, 33]. One example of this research is the eDiaMoND project that studied the development of new practices in mamography and the key importance of skill and trust between scientists [21, 23]. More recently, Brown et al. explored how wikis could be appropriated to support collaboration amongst ethnographers [6] and Fraser et al. examined how tools could support practices of remote joint video analysis sessions [14]. This work has been part of the move away from notions of ‘eScience’ into the concept of ‘eResearch’.

Lastly, a growing body of literature has documented experiences with the use of cyber-infrastructure in science practice [4]. A key focus of this work has been on data sharing - several initiatives support the practice of data sharing and modeling for the purpose of collaborating on social science projects, for example the Virtual Data Center, an open-source, digital library system designed to assist researchers in sharing and disseminating data [1]. Other researchers have used ‘Grid technologies’ to explore and model spatial distribution of crime using analytical frameworks from science and technology studies [40]. Here, studies emphasize that data sharing should fit into communities of practice and that the social role of data within science is important to consider when designing data sharing systems [5, 14]. One of the greater challenges is that these communities of practices are fluid and constantly renegotiated [5].

3. METHOD

Our research interests were broadly in the collaborative practices of social science research, and how this collaboration extended to the practice of fieldwork and field based research. We interviewed sixteen researchers attempting an open-ended way to understand their collaborative practices, how they initiate and manage connections with colleagues, and how they manage and conduct their fieldwork. Initial inquiry emphasized general practices but further questions asked directly to technology use in relation to collaborations. We included researchers who published work that involved direct interactions with those who were being studied, with data collected from the field in the actual places where those being studied worked, lived or visited - broadly research that involved ‘field work’.

This encompassed work that would be recognizable as traditional ethnography, research that involved the use of structured questionnaires, video analysis of settings, life histories collected from in-depth interviews, and even observations and video analysis of congressional debates. This fieldwork spanned a large variety of different materials and our participants in turn brought a range of analytic approaches and orientations, in part tied to the very different topics that they researched. We recruited participants through snowball sampling using personal contacts at three universities, one in the US, one in Denmark and one in Sweden as well as a criminal policy research institute, and one health institute, both in the US.

While the concept of fieldwork is familiar in CSCW, it is important to recognize that not all fieldwork is the same. Our interviewees differed in their use of methods noticeably - four made use of computer assisted survey systems alongside paper questionnaires in their fieldwork, one used life histories, others used focus groups. In particular our researchers used much more structured methods (‘instruments’) with larger sample sizes than traditional open-ended ethnographic-led methods that characterize for example HCI fieldwork. A broader range of settings also constituted ‘the field’ - e.g. prisons, street corners, remote South American villages or the alcohol sections in supermarkets.

Few of the researchers we spoke to only used fieldwork - most supplemented their materials with others’ data, archive records, and of course with the writings of other researchers. Six researchers identified themselves as sociologists, three as education researchers, two researched substance abuse, and one each for cognitive science, science and technology studies, economics, ethnology and criminology. The participants ranged from graduate students and research assistants to full professors with over 20 years of research experience. Eight of them were researchers in Sweden and Denmark, four were at large public US

universities, and four worked in non-profit research organizations in the US. None of the researchers worked directly in the CSCW or the HCI field, although technology was of interest for four of our researchers.

4. COLLABORATION STRUCTURES

Collaboration was key to the scientific practices we studied, but not simply based around data sharing - as Ellis et al. argue that data sharing is only a small part of most of the interactions that take place in both science and social science [12], despite the attention it has been given in the current generation of cyber-infrastructure systems. For the social scientists of our study, their social relationships were much more important than any notion of 'data sharing'. Collaboration with other scientists was not only common to our participants but a characteristic of virtually all their research. Some of the senior professors mused that this had changed from when they had conducted their thesis work some 20-30 years ago and argued that with the increased pressure to publish, it was now necessary to collaborate in order to keep up publication count. They simply did not have enough time to work on solo projects any longer.

4.1 Four Types of Collaborative Setups

Amongst our social scientists we broadly identified four types of collaborations: long term small group, local opportunistic, apprenticeship, and large scale collaborations. To an extent these categories are fluid, yet they each characterize distinct types of collaboration:

4.1.1 Long-term small group collaborations

One of the most important forms of collaboration that our social scientists described involved close-knit collaboration between themselves and one or two other peers. All except two interviewees (who were relatively junior) had these types of collaborators. In some cases they were from the same department or a local institution, but usually due to the high mobility of social scientists these collaborations took place over a distance. Our academics co-authored repeatedly within this group, and the relationships often represented the single most important collaboration of that researcher in his or her career. Some researchers were polygamous, in that they would be a member of more than one close collaboration, with each group featuring a different research topic or interest, but many kept to one close collaboration, sometimes for their whole career to-date.

These collaborations often emerged early on in the researcher's career - in one case it had started as an advisory relationship, but in other cases they had started serendipitously between researchers when they were in the same institution. They were maintained highly regular contact (multiple emails or face to face meetings per week) and a collective set of views and opinions in relation to 'other' researchers. For example, one collaboration started between three researchers who had watched a documentary film together, approached the creators of the documentary, wrote up a funding proposal with their assistance and after receiving the grant began a long-term collaboration together. Another example was a reoccurring collaboration between a Swedish researcher and two US researchers (a husband and wife) who had spent the last ten or so summers in Sweden working with him. This collaboration was surprisingly close-knit considering the distance, particularly during the summer when they were co-located. Most other researchers' collaborations did not involve regular visits, but rather opportunistic meetings and a large amount of communication through email and phone. Two of our researchers

had actually moved institution to be closer to those they collaborated with.

4.1.2 Local group collaborations

A distinct set of collaborations took place between colleagues who were at the same institution. These were not valued as the long-term small group collaborations, but instead took place opportunistic around shared resources, funding or interests. In many cases our researchers would collaborate with a local colleague despite differences in approach because their locality removed the costs of working at a distance. Alternatively, often a local fieldwork sites would provide an impetus for working with local colleagues. Potentially these collaborations could grow into longer term collaborations, but in most cases they acted more like low-commitment 'trial relationships'. These collaborations also helped to expand researchers interests and knowledge - exposing them to new ideas and literatures.

Alongside these local group collaborations, our participants also often worked in local research groups, and other groups that were mandated (or at least inspired) by organizational commitments. Usually these groups did not feature intense co-authorship, but rather acted more as intellectual spaces where ideas could be presented, visitors could be hosted etc. This is not to say that co-authorships were rare- they often came about through collaborations between students and faculty where the students brought together the faculty through co-writing projects.

4.1.3 Apprenticeships

An interesting difference between the Scandinavian researchers and the US based researchers was their approach and collaboration with students, both graduate and undergraduate students. The Scandinavian researchers rarely talked about their students and when they mentioned them, they did not view their relationship as a collaborative one but instead an advisory one. We found two exceptions out of the eight Scandinavian researchers, one researcher who hired Masters students as research assistants each year for one of her research projects and another who maintained a strong small-group collaboration with a PhD student. The US based researchers on the other hand all mentioned students as collaborative relationships. Their rhetoric about students also differed; one professor for example, repeatedly talked about students "working for him" collecting data and performing analysis on several of his research projects. The differentiation in approach to student collaboration obviously reflects not only cultural differences but also differences in student infrastructure between the countries. Where PhD students in Scandinavia tend to be older than their US counterparts they also often have only 3 years to complete their PhD, leading to a more condensed period where the student is allowed to focus solely on their own project. In the US, where PhDs generally take 6-8 years, it is not uncommon for new graduate students to work on projects dictated by their advisors for the first few years in order to 'tune in' to the world of research.

4.1.4 Large scale collaborations

Eight of our interviewees had worked or currently worked on large-scale cross-country collaborations. These included cross-Nordic collaborations, EU projects, NSF projects and national institute of health funded US-wide projects. The interviewees who had not had cross-country collaborations were mainly young researchers. The cross-country collaborations were often described as problematic; factors such as differing research approaches and lack of coordination were often cited. Other factors were the rather bureaucratic nature of particularly EU projects that the researchers often faced. One participant described

how a Nordic project on alcohol consumption in restaurants had ended up rather differently than he had intended when he started as director:

[The researchers' different research approaches] caused quite disparate papers [ha ha]... they do different things. [...] I think the ambition in the beginning was to do [the research project] more comparatively, to use the same research questions, the same methodologies. Ehm, different traditions, histories, lack of resource, I would say, led to situations where people... Okay 'do your thing', instead of trying to raise funding, coordinate it, [...] I don't know if it quite failed, it changed and in the process you have ambitions... meeting reality... that thing happens.

The concept of 'meeting reality' was a reoccurring obstacle noted in relation to these larger projects. While initial plans (often described in a funding proposal) would involve deep collaborations, these came to be discarded as projects 'met reality'. Collaborations took place around loose-coupled work, with research mostly in isolation and only one document (often the funding proposal) and an initial meeting as basis for the research. Although these collaborations did generate face-to-face workshops, one interviewee reported about a project that even though "we met all the time", the research practices and perhaps cultural differences contributed to a diversity that prevented close-nit coherent work.

We now continue by outlining a few core concepts that emerged as being valuable for the collaborations that were described positively and that most often ended up with results not just publishable, but results considered significant for the individual researcher and his/her career.

5. RESEARCH COLLABORATION PRACTICES

Conceptually one can divide up fieldwork in terms of its distinct phases - from formulating and planning research (and obtaining funding), through participant or setting recruitment, the interviews and observations themselves, data entry and transformation of data, analytic revision, revision and extraction of arguments, to writing and revision. Each of these phases not only involves different jobs and work processes, but also features differences in terms of how easily or essential collaboration was to the task.

While it is tempting to characterize certain phases as loosely or highly coupled, each stage features characteristics of both. Fieldwork, for example, is something that can be easily conducted in parallel more or less independently. Yet there are aspects of fieldwork that need to be coupled - in particular the emerging interest and insight of those carrying out the fieldwork. Without this then different fieldworkers could end up with radically divergent views of a particular setting, and viewpoints that are not necessarily in conflict but are instead irrelevant to each other. For this reason if fieldworkers regularly communicate then the later analysis stages can be much more successful. Indeed through many of the phases of a research project there is the challenge of keeping the independent paths engaged with each other, such that when it came to writing the report or paper at the end the different materials could be brought together.

This is what often went wrong in large-scale projects. Individual researchers focused on different branches of the overall theme or project and despite workshops that should have brought the fieldwork together, participants reported that these workshops were often failures in other than very general idea exchange. When it came to the final report, it often consisted of separate

distinct research pieces rather than connected parts of a whole. Research groups working together at a distance often found difficulty in calibrating expectations on what was going to be done where. For example, one of our researchers worked on an autobiography study of alcohol consumption, aiming to be a comparison between people's perception of alcohol in Sweden and Finland. The Swedish researchers created a website where participants could provide their biography, yet the Finnish researchers only put up flyers in public forums with no corresponding Finnish website. This resulted in a large difference between the number of entries received and the length of the entries between Sweden and Finland.

One of the key aspects to collaboration then is to find the right times to work together, and the right times to work apart. For researchers that are physically close this could entail simply working from the same office - such as when a senior fieldworker and a more junior fieldworker worked together, supporting a fluidity in moving between tight and loose coupled work throughout the fieldwork. In particular, we highlight two core issues that contribute to successful collaborations.

5.1 Routines

One way of dealing with complexities of collaboration is to make use of routines - such as weekly phone calls or meetings. For those working together at a distance these sort of temporal structures were important - as has been confirmed in much earlier CSCW work [24]. For the long-term small group collaborations that we discussed above the flexibility of the academic calendar proved to be essential to support their work. Researchers would use visits (such as the summer or sabbaticals) to spend intense time working together, packing the 'tightly coupled' work into the time they were together. Others would travel together on fieldwork trips, for example one researcher travelled to the north of Sweden with two of his collaborators for a month to gather data and produce a documentary film. Fieldwork time together was important not just for conducting fieldwork but also for understanding better other researchers.

Meetings also took place over video conferencing systems and simply telephone conferences, popularly over Skype. One researcher who worked within smaller but geographically widely spread groups (for example Japan, the US, Sweden) used it extensively: "Yep, I use Skype, but we also use something called Marratech, which is a videoconference system, basically that you have it on your laptop or computer [...] we use it a lot and it's very, very good." Other researchers relied mostly on the phone, particularly if their small core collaborations were couple based. All in all seniority or experience had little connection with level of meeting technology used, instead it seemed to be used if one of the collaborators were a 'driver' of new technology and had introduced it to the rest of the group.

Interestingly, the approach to these meetings were mixed; some were considered important and essential, other meetings were simply considered mandatory and possibly time wasting, depending on the level of autonomy the researcher had over them.

We have a weekly conference call. On Mondays. [...] we talk about our field experiences. We'll write a short note on who we interviewed this week [...] You are asking the same questions, [but] you might get a more colorful story. "She was a college student she was using Xanax 30 times in the last month. And --- 60 times in the last months. And she had a friend that died, and she had used heroin but had stopped when her friend had died." It's really a debrief, I don't think it does anything, it might generate

*the odd idea every now and then but it's more about being a team.
(US based health researcher)*

As the example above show, the meetings were not just in place for the sake of communication, but as much as a complement to team building. For the rare collaborations where the researcher had not met in person, they expressed that it was nice to be able 'to put a face to the name' through video conferencing. Viewing regular meetings as part of the routines that contribute to successful collaborations might seem obvious; however, the important point here is that it was not only the communication conveyed at the meetings that made collaborations; instead it was establishment of the meetings as routine and the routine around the meeting technology, that meant these meetings contributed to the successful collaboration.

5.2 Collaborators Learning to See Together

Earlier research into the practices of ethnographers emphasized the importance of 'seeing together' amongst fieldworkers [6], a sense that researchers share a developing view of what they are studying together, and that over the course of a project they can come to a consensus on what are the important aspects of the setting they are studying.

This was as much the case in quantitative work as much as qualitative. Broadly in quantitative work there is a desire that the results from different participants are comparable. Yet this depends upon considerable work by the researchers [29]. Questions might be phrased in a particular - standardized - way, yet participants might simply not understand the question and require some explanation before they can answer. This presents a challenge in terms of making sure that different participants are answering the same question. Or alternatively, participants might have their answers codified and it can be necessary to make considerable judgment about what answer fits into what category. This creates a need to work out a common approach across fieldworkers, but also there is a need for those analyzing the data to be aware of these contingencies further down the process.

Moving beyond the individual study there was a similar sense of seeing together for our long-term small group collaborators, but something that acted on a different scale than an individual study. For these groups what was key was not necessarily that those involved agreed as such, but that they came to define their research field in similar ways - that they identified similar problems, found similar aspects interesting, and that they characterized the research field in similar ways. Behind this there would of course be a certain level of agreement (researchers might come from the same intellectual school or tradition, or might have similar views on others work) but this base acted to set a scene where productive work could be done, often through disagreements, and the resolving of those disagreements.

This common viewpoint came in part from working together over a long period of time - not only reading the same pieces, or discussing them together, but also reflecting on others' positions - particularly how this came out in writing together. For example, one academic met his close collaborator during his PhD through a shared advisor, and they now worked together on nearly all their research projects.

So even academic relationships that might be characterized by disagreement - at least to a practical level, still depended on a large amount of agreement - agreement in the sense of seeing together the academic field. For students of our researchers, frequently their 'job' as such was to try and understand and come to see the worldview of their advisor. Indeed, most of our

researchers considered themselves still 'attached' in some way to their advisor in that they had inherited their view of the field. This might not be something that they would agree with, or even that they might share, but to understand the subtlety and complexity of a particular viewpoint on a research field proves to be valuable training for future academic work.

Seeing together also constituted a common view of collaboration technologies, what was appropriate to use and what was working well for their specific collaboration practices. Obviously Internet based information search and email were the major players in terms of research collaboration technologies, but data collection and data analysis technologies helped this process of learning to see together. One professor explains about a colleague who enjoys programming, even though he potentially could hire people to do that work:

He programs the statistical techniques, and so he uses this [...], which is a programming language. Our cooperation is quite interesting because I like to write the first ideas, and so on, and he loves programming, so he jokes in a self-ironic way, he says it's wonderful to be a research assistant. That's when I'm most productive, you see? [...] So, when he and I work together, I push the project and he does the program. He loves that. So, he said yesterday when we went to lunch, "My favorite programs are when I'm the research assistant." He is a leading researcher.

The creation of the statistical equations and programming measures contribute to the researchers common understanding of the data and helps them view their data from specific perspectives. We now continue describing some of the challenges that the researchers encountered in their research practices in relation to research coordination.

6. CHALLENGES TO RESEARCH COLLABORATION

Fieldwork practices relied heavily not only on the researchers' own individual previous and established practices but also on the practices and influences of collaborators. This often posed challenges at different stages in the projects from the initiation to the writing up of results. We found it valuable for the analysis to explore our data in terms of structural challenges. We have themed the challenges into five themes: initial phrasing of projects, the collection of information and data from electronic sources, access to fieldwork sites, fieldwork practices affecting the results and sharing data.

6.1 Initial Phrasing of Projects

As with any research project one initial job is the formulation of the project, gaining funding and institutional approval. Fieldwork based projects present a particular challenge here in that the nature of the work prevents the exact formulation of the study prior to the study being conducted. Yet the requirements of funders for a clear overview and plan for the work - can conflict with the emergent nature of the findings of fieldwork. This can be problematic even in the most structured and quantitative of studies where applications for funding might require an outline of all the questions that will be asked - even though it might be desirable for these questions to emerge from preliminary work. This can also be the case for ethics approval where for the study to be 'signed off' before the start of empirical work.

The challenges herein were particularly profound among the Scandinavian researchers who had been involved in EU projects. These often require a specific variety of partners in different countries and areas of Europe; such requirement resulted in

having to ‘cold-call’ research colleagues unfamiliar to the participants or being involved in projects mainly because of their geographical position. One of the Swedish professors explained a situation:

I'm very skeptical and prejudice to the process, 'cause they [the EU] are forcing a structure upon you [...] What happens is that someone somehow now ... this was in Barcelona, got an idea. Here we have a possibility to get a lot of EU money, [...] so this is an opportunity for us to do some research around the subjects focused around the strategy in some kind of form. [...] What they do then is 'yeah, we should apply, but we need partners'. So then they sent out, often just by email 'hi this is [name] from England'.

Interviewer: People you don't necessarily know?

Well, no, I know him, but not the others down there. So they describe the idea ... then they try to describe there is a lot of money in it for you and it is no hard work [laugh], and then it continues like that. But then the EU forces you to formulate your research in a particular, certain way, which really is, it is very strange I think. People don't think. It is just formalities. It is superficial...

These projects were not based on long-term collaborations or tight-knit colleagues and were more likely to encounter problems, as also described above. The challenges were particularly profound in the initial phase of a project, where partners attempted to gauge one another in terms of motivations and planned effort. Communication between partners was key, but it was rare to see actual workshop based meetings in the initial phase of projects. Instead the researchers communicated almost solely via email until the funding was acquired and then they met at so-called ‘kick-off meetings’.

6.2 Collecting Electronically Available Data

A profoundly technological challenge to fieldwork research was an activity also often taking place initially in a project. Even though all of our participants conducted fieldwork with human subjects, all project included phases of collection of electronic information, including searching for related literature, source material in libraries and picture material through electronic or analog networks. A few of the researchers based the majority of their research on mainly electronically available data.

Unsurprisingly all of the researchers used Internet based information search, but some needed more structured data than others. Here, limitations introduced themselves as problems accessing the right data through library websites and the data sometimes being constrained to access from within the actual libraries, making it necessary to work together either in the library or make sure enough notes was in order for a collaborator to understand the original data. A US based researcher for example, had to travel or have his research assistants travel to Washington DC to collect archived law material from the 19th century. These documents were not online and only available at the Library of Congress; the travel to Washington DC always meant a cross-country flight adding significantly to his research expenses.

Although the information collection was at times problematic, the researchers showed a significant ability to ‘work around the systems’, to find a way to get the information they needed. This is in many ways of course the essence of fieldwork research, but we found that it was a characteristic of activities connected to the long-term small group collaborations; researchers relied to a large extent on their close colleagues to do this type of work with/for them and help out in complicated cases.

6.3 Access to Field-Sites

A third set of problems emerged around access to particular settings and enrolling participants in the study. While access can be arranged in advance it is always contingent on changes in personnel, or simply the changing conditions of the field-site. One of our social scientists, for example, was studying shopping habits in supermarkets. She relied on the particular supermarket manager’s cooperation each time she went out in the field to interview shoppers, even though she had a general permission from the greater company who were partners in the project. She found it frustrating that some times they were allowed to video-record customers (after customers’ permission of course) but other times had to rely on paper notes. A similar but more pronounced problem of access was encountered by another researcher who was doing fieldwork in hospitals and hospital-attached accommodation for outpatients who lived too far away to commute. Not only was she continuously denied access to the hospital ward that the project had originally negotiated collaboration with when submitting a funding proposal, she also felt she was approached with hostility from nurses and staff when she finally gained access to the hospital accommodation house (‘the patient hotel’). She did report that the patients themselves that agreed to talk to her were very welcoming and approachable and she was able to collect data through interviews and observations with them. These examples illustrate how collaboration between researchers is not the only issue of importance; also the collaboration between researchers and people at the field site is of essence, particularly in environments where people of power to grant access can readily change their policy.

Four of our researchers worked with vulnerable populations, making use of public places (homeless, transsexuals, drug addicts) for ‘street’ recruitment. This involved walking up to ‘likely’ individuals in settings where the groups of interest were known to inhabit. To get around problems of commitment in these settings these researchers made use of screener interviews - shorter interviews that, if the right candidates were found, resulted in an invitation for the main interview. While this at least increased the proportion of potential interviewees, screening interviewees on the street presented practical problems of climate and environment. Interviewing only those available and willing ‘on the street’ to take a small remuneration for their time was also lamented as skewing the sample of informants.

This set of challenges is characteristic of a great deal of fieldwork but among our social scientists, it sometimes defined the organization of the fieldwork to a further extent than planned and desired. So although the researchers managed to work around obstacles of recruitment and access, the fact that such settings are problematic to navigate in the first place meant that collaborating with other researchers on these projects was not contributing to the main challenges within the project, except conflicts internally about what kind of access had originally been negotiated. Two researchers expressed frustration about this ‘lack of communication’ that occasionally influenced their access to the field sites.

6.4 Fieldwork practices affecting the results

As with any form of fieldwork a key issue is that the conditions where it is conducted are not under the control of the researcher. This is the very advantage of fieldwork - that the researcher can find out the unexpected and work is embedded in the settings it investigates, but it also presents ‘everyday fieldwork problems’ that need be resolved.

The actual collection itself often presented its own challenges and trade-offs. For example, one of our social scientists was video recording the interactions of children in a museum - she knew she got more useful data from using a head mounted camera on her child participants alongside filming the learning activity, but she worried that the actions of the child with the camera were to a certain extent affected by the presence of the camera. This researcher explained in length how small the camera was, but admitted that the children constantly commented on the fact that they were being recorded when interacting with the camera-mounted child.

For our researchers who had more structured projects an ongoing challenge was in managing how questions were asked, and how the answers that were given were translated into results. Behind the use of survey data there is the desire for comparability, that the survey can be used to say that a set number of individual had a certain behavior or opinion. Yet this rests on making comparable the natural variability of individuals. Moreover, the concepts that lie behind the survey questions must in some way connect with the behaviors that are being surveyed.

One technology that had received widespread use was digital audio recorders - the different fieldworkers we interviewed all collected large corpuses of audio data from their fieldwork. Yet this audio data was seldom used as part of the analytic process, but more as a safeguard should data be lost from the other ways in which it was collected. The key problem with audio was that it was difficult to index and access - in particular there was no way of comparing audio data by (say) question asked. Moreover, since transcribing audio data was expensive and difficult to arrange audio data usually remained an under exploited resource. For our researchers who used video data they shared the data through online repositories or simply by viewing it together with others or sending a selected snippet to a collaborator. As with audio, video also was a frustrating material to work with in that it was extremely time consuming to review and to analyze. As one researcher expressed: "Often [our] qualitative data isn't used because they end up with hundreds of hours of tape and no reference or start point." Instead the researchers relied solely on the quantitative survey data they had recorded within their system.

Perhaps the key problem for research though turned on how questions were asked, understood and answered. Key to good survey research is asking the same question the same way across all the different participants who are being interviewed. Yet different participants might understand questions in very different ways, or simply not understand the question. This requires the researcher to explain what the question means. While this might seem unproblematic, it can lead to slightly different questions being asked. For example, a term such as 'sexual partner' might mean very different things for different people both in terms of interviewer and interviewee. The order that a question is asked might also lead to different interpretations - if a question about number of sexual partners follows a set of questions about oral sex, transgender, casual sexual encounters and the like, then it is likely to get a higher answer than if it is asked individually.

Questions are also answered in different ways. Most surveys are designed with a small set of answers to each question so as to support the comparability of answers between those interviewed. Yet the answers that are given often do not clearly fit with these different coded answers - one of the jobs of the interviewer is to convert the answers given to standardized answers. Yet if there is more than one fieldworker, or if interviews are being done in

different places, it can be difficult to ensure any sort of regularity between interviews.

I worked on a survey last year where they changed the instrument all the time. And it was such a mess. It just ended up, you couldn't use 10% of the questions. It's a really difficult. People talk about quant data as if it's the guiding light, of real and true. Whatever. And it's just not at all if you've got people asking people. People ask the questions differently.

To address this survey researchers would tape record their interviews with the goal of being able to 'back track' should there be any problems with the questions being asked. Yet this was rarely done because of the difficulty of sharing and accessing audio files. More open ended or qualitative work was not immune from these problems either - most ethnographic work relies upon comparability between different settings that might in many ways be quite distinct. While there is not the strong commitment to straightforward simple comparability, ethnographers who worked together resorted instead to sharing fieldnotes and summaries of interviews as a way of making sure that the other researchers shared a similar viewpoint on the field [6].

6.5 Sharing Data

A final challenge emerged when the researchers were ready to share (empirical) data with their collaborators for discussion and analysis. Their physical and digitally mediated meetings were augmented by the constant sharing of electronic data of different sorts. Fieldworkers often upload data in different forms, such as field-notes that are sharable with a team, or data that had been input from questionnaires in the field. We were struck by the reliance of the different researchers we studied on the uploading and downloading of data to servers. Participants used a multitude of tools - FTP, Sharepoint, Entryware, emailing files around and uploading video files. While there were shortcomings in all these mechanisms, and the mechanisms used were relatively crude, data sharing was not identified as a problem for research as such. Indeed, current technologies successfully supported a background expectation amongst those working together that their data was shared as it was collected. Yet, the lack of structure and generally accepted data sharing formats introduced problems for the collaborations, particularly the large-scale ones. In a cross-country project for example, the data had been collected on paper in one country and electronically in the other. The researchers we talked to were unable to get an overview of the paper-based material before actually visiting the other country's research team. Their electronic data entry practices did not afford a direct comparison without actually meeting in person and get a mutual understanding of the two different data sets. In essence a characteristic was that the shared data did not exist in itself - it acted as a background to other interactions around the fieldwork project - data was important but could not be understood if shared without further interactions.

While many of these practices described will be familiar to readers, our broader sample presents some interesting insights. It is important to point out that by describing these collective practices we are addressing a more diverse set of fieldwork researchers than what one individual could describe in terms of own experiences. These practices are important to trace and analyze in order to provide insights into broader research collaboration technology design.

This brings on the subject of how, more specifically, technologies can be used to support the different fieldwork and collaboration practices that we have outlined so far.

7. DESIGNING TECHNOLOGIES FOR COLLABORATIVE RESEARCH

The examples above illustrate some of the constraints and common challenges that the researchers had in their fieldwork collection and analysis. It was evident that they adjusted their practices to the technologies as much as they chose technologies appropriate for the tasks at hand. Their choices were often made together with their close collaborators and similar to previous research on collaborative software for information workers, this choice often helped establish a group identity and form intra-group bonding [34]. Challenges to collaboration were often reflected in technology challenges, either as conflicting utilization of specific applications or simply as a lack of utilization of a wider set of communication technologies. The large-scale, more complicated collaborative relationships were often solely based on email contact alongside sporadic or regular face-to-face workshops despite the availability of both video conferencing and simple phone conversations. These ‘richer’ communication technologies required an intimacy that was rarely present in broader collaborations, or they required a considerable effort from the partners initially in the project.

A relevant implication is the potential for the use of more ‘in-between’ technologies such as text-chat and the blending of informal and formal communication tools. The ability to talk more informally, yet regularly about projects is likely to promote better collaborations within the long-distance large-scale projects and text-chat has many characteristics of informality. In the corporate world, companies have had success with social media specific to the company, meaning that social relations with work colleagues promotes closer work relations [11]; it is likely that social media relationships between larger groups of collaborators can also cultivate better communication and increased collaboration.

An emerging characteristic of the technology use among our set of social scientists was that although each technology tool affected the collaboration ‘moments’ and even the overall projects, technologies as such were not responsible for successful or less successful projects. Instead they reflected the quality of the collaboration by being diversely used within successfully described collaborations and limitedly used in less successful projects. The optimal situation was when the social scientist worked around the technologies and picked the ones that worked for them in their particular situation. They developed a common vocabulary within their tight-knit collaboration, something characteristic of the smaller scale collaborations.

7.1 TagPad

We were able to address two issues with a technology prototype for fieldwork interviews. The first issue relates to how our participants often found it difficult to structure interviews in a way so colleagues could replicate them or at least conduct them similarly enough for an appropriate analysis. The second issue was one of more ongoing analysis during or right after actual data collection. We developed TagPad, an application that runs on an iPad, and which records interviews and let the user structure the audio according the interview schedule. On a conceptual level TagPad can be divided into three different parts: the TagPad application itself, the platform it is running on – a tablet computer, specifically an iPad, and the integration with a cloud storage service, in this case the service Dropbox. This combination is what makes up and defines TagPad. The TagPad application has two different views: the interview view and the analysis view, the interview view being the main view (See Figure 1). As input data TagPad can record audio, save short text entries and use multiple-

choice items. The researcher decides how to combine the input. For example, TagPad can be used to record audio only, it can be used for only short text entries and/or multiple-choice questions (or a combination) or a combination of text and audio. Because of this flexibility TagPad can be considered a multi purpose interview tool suitable for a wide selection of qualitative and quantitative studies.

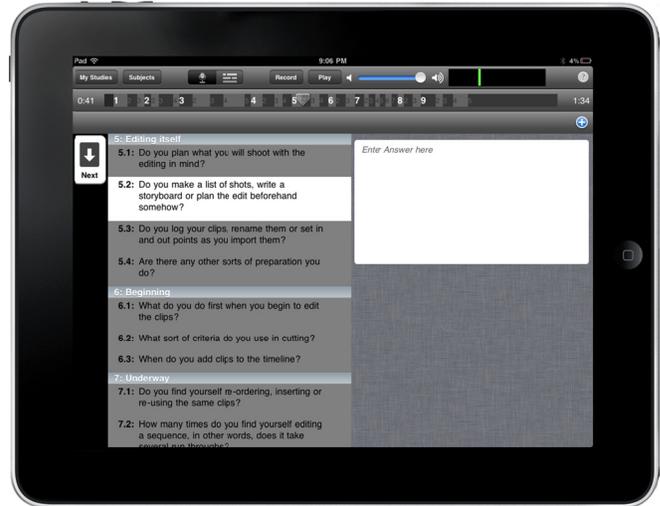


Figure 1. The interview view: An interview guide loaded into TagPad and question 5.2 is selected.



Figure 2: The analysis view of TagPad. Custom tags can be added to each interview for pre-analysis.

TagPad has a simple analysis view for quick analysis to support selective transcription (See Figure 2). Besides having playback capabilities tags are automatically added to the audio timeline for each question so it is possible to locate where in the audio a specific question was asked. Custom tags can be added making it possible to navigate, locate and share specific audio segments. Tags can be added both during and after an interview.

The portability of the iPad addresses the vital aspect: mobility. Additionally mobility is supported because the iPad agilely can be prepared for an interview and operates fairly long on battery without the need for an external power source. Mobility is

essential because data collections in the form of interviews often will take place in the field requiring flexibility of the researcher.

The use of cloud storage is also a defining feature. Advantages are effective and simple data maintaining, distribution, and support for collaboration. With cloud storage the service provider handles most of the technical aspects such as backup of data and there is no need for manual management of the storage and configuration of the system. Disadvantages include potential issues with bandwidth, performance, reliability and availability and that some projects may have very specific records-keeping requirements.

TagPad is designed to address only a subset of the reported findings from our study and we are not expecting it to influence the larger collaboration structures at place among social science researchers. However, we do believe that a tool like TagPad has potential in terms of improving some research activities that have been discussed here.

8. CONCLUSION

Drawing on interviews this paper has documented different collaborative aspects of science research practice. We focused on the sociality of social science fieldwork practice - how is that social science collaboration depends upon small group long term collaborations, alongside local and larger scale research collaboration. The paper went on to document how collaboration practices were arranged - the amount of coupling of different parts of the work process, spatial and temporal routines and the importance of 'seeing together' of researchers being able to share a viewpoint on what was important in their research field. From this we documented specific challenges in terms of research practices and how technologies are involved in the fieldwork.

It is important to highlight how our results add to a growing field of cyberinfrastructures and group technologies but by addressing a more qualitative research space. Much other relevant research focuses on information workers and their collaboration tools but the profound characteristics of social science researchers have rarely been addressed. Our results are a first step in the direction of exploring the fieldwork research technology space and while many of our findings overlap with the findings from those two other spaces, we find it important to point them out in an aim to suggest designs for technology for small-scale fieldwork. TagPad, which we briefly presented here, is a tool that we are developing for empirical data collection and initial analysis, particularly focused on small-scale close collaborations. It is designed to support collaborative social science fieldwork practice - in particular collaborative interview based fieldwork projects. We are currently studying TagPad amongst a number of different research groups who are using it in their fieldwork practice, and are planning to provide further insight into the use of it in future publications.

Beyond the implications of this work for cyber-infrastructure it is worth considering how different models of research practice inform funding decisions and the organization of funding councils, as well as more broadly support for academic and intellectual work. If the key relationships for the social sciences are smaller and more longer term than science, this would suggest quite different arrangements to how we currently organize much of the support for collaborative scientific practice.

9. ACKNOWLEDGMENTS

Thanks to the social scientists that participated in our interviews. Thanks to Malcolm Hall and Nis Bornø for their efforts on design and development of TagPad. This research was funded by NSF Grant #0838330.

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