

TagPad: Supporting Field Interviews and Analysis

Nis Borneo
Aalborg University
nis@cs.aau.dk

Louise Barkhuus
Stockholm University
barkhuus@dsv.su.se

Abstract

The area of cyberinfrastructures has looked extensively at research within the natural sciences, however, the social sciences have been largely overlooked in terms of novel data collection and analysis systems. We developed a probe tool, TagPad, to look at the process for social science data collection through interviews and surveys. Our research participants found that TagPad facilitated structuring of interviews but we also found that the setting in which the interview takes place is essential to the success of using this particular tool. We conclude suggesting future designs of social science research tools.

Keywords: cyberinfrastructures, e-science, e-research, social science, qualitative research

Introduction

Scientific fieldwork poses a range of challenges to researchers, both in terms of conducting data collection and analyzing data collected 'in the wild'. These challenges include choosing methods for data collection, methods for analysis and choosing technologies that will best support the method decisions. The decisions needed should be informed by issues such as appropriate method for the research question and available technology. These technologies need to be tightly tailored to the research aim and question in order to be efficient. Recently the field of cyberinfrastructures (or eScience) has addressed the need for more powerful computational tools for data collection and analysis. With a focus on large scale data sets and natural science, however, the field has broadly left out technologies used by social scientists and their often more qualitatively oriented studies (Wouters & Beaulieu, 2006). Although social science fieldwork often make use of simple technologies for example when conducting ethnographic studies, such as audio recorders and notebooks, and simple affinity diagrams for analysis, these scientists also utilize a wide set of computational tools, many which have hardly been addressed within cyberinfrastructures (Kaziunas, Sawyer, & Østerlund, 2011).

In this paper we address the complexities of social scientists tasks of collecting data 'in the wild', particularly in terms of interview data and text data collection as well as the treatment of this data for analysis and result-generation. Previous research has provided insights into many aspects of data collection methods for fieldwork research, but few studies have looked closer at novel data collection technologies in their real world use. We developed a fieldwork probe named TagPad, which is a tool for interview and text collection, as well as a tool for analysis support. We let eight researchers and scholars use TagPad for their studies and observed them using it, as well as interviewed them afterwards about their experiences. We found several factors influencing their use of this probe tool in terms of setting, the structure of interviews and analysis, and describe how their interview and data collection practices in return affected the usefulness of TagPad. The useful aspects of TagPad was its simple option for back rolling (that if need be, it could be used as a regular audio recorder, the previous technology the researchers had used) as well as its smooth blending in to some settings. The tool's weaknesses showed up in settings that were sensitive to new invasive looking technologies and therefore did not fit into naturally. Instead it prohibited natural interaction between researchers and participants. Before presenting TagPad in detail we review previous literature that has studied research processes.

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Related Literature

Cyberinfrastructure Research

Cyberinfrastructure, or e-science, describes a range of technologies such as computational support, access to data sources, tools to support access and use, and analysis of this data. The area emerged as computational possibilities increased and was seen as a 'neutral' technological platform for large scale research (Kaziunas et al., 2011). However, much current research on cyberinfrastructure has been dominated by the natural sciences (Schroeder & Fry, 2007). While grid computing, shared access to computational models, or 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 (David, 2006). The emerging program of e-social science, or 'e-research' has developed to address the distinctive problems of social science research (Wouters & Beaulieu, 2006). Technology aimed at social science is an expanding field and several tools have been presented during recent years (Beaulieu & Wouters, 2009). In social science different Computer Assisted/Aided Qualitative Data Analysis software (CAQDAS) tools have been available for a long time. While acknowledging the great diversity within the social sciences, social science research frequently deals with relatively small sets of data, theoretical explorations, and a long term commitment to investigating from interpretivist, or at least non-positivist, traditions (Barjak et al., 2009; Locke, 2011; Lynch, 2000). For these social scientists their work problems and potential use of cyberinfrastructure are distinctly different from the concerns of 'big science'. Social scientists rather rely on existing technology such as e-mail and portable tools and focus on robustness of tools (Beaulieu & Wouters, 2009). 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 (Barkhuus & Brown, 2012; Brown, Lundin, Rost, Lymer, & Holmquist, 2007; Goodwin, 2001). These practices demand distinctive collaborative tools, tools built from an understanding of the intellectual and collaborative processes involved.

Fieldwork Technologies

With new computational possibilities and mobile devices, the option of using data collection technologies in the field emerged. Already in 1999, Guice, Hoffower, & Norvig suggested three types of potential technologies for fieldwork among astrobiologists, which they had studied. Acknowledging that different classes of work practices require different classes of information technology innovation, they divided the tools into project and logistics management tools, mobile communications tools and advanced data collection and manipulation systems (Guice, Hoffower, & Norvig, 1999). Our TagPad in fact ranged across each type by providing easy management of interview and text data material as well as being a specific data collection tool. It even provides wireless uploading of data (mobile communications tools), although this is obviously more on the account of the platform, the iPad, which allows this, than a feature of TagPad itself. In terms of already existing systems several early experimental systems have been presented. Coughlan et al for example created a remote communication system for earth science teachers and students, where data from the field (voice, pictures, video) was streamed to a "mission control environment" (Coughlan et al., 2011). They report pros and cons of this approach, particularly in terms of the obstacles for the researchers inside to get a detailed enough overview of the data. In terms of collaboration around paper writing services such as Google Docs and other cloud based services now provides similar tools as was suggested in 1999 by (Cohen, Cash, & Muller, 1999): Current status of group members (logged in or not), current status of the document in question and (a limited) history of edits in the document.

Preliminary Study of Fieldwork Practices

The work on TagPad builds on a previous study that we conducted, exploring fieldwork practices and collaboration among social scientists (Barkhuus & Brown, 2012). Our study illustrated how the strongest collaborative research groups are of often small scale, long term groups of 3-4 people who continuously work together on several projects, often through the majority of the researchers' career. Our

study also pointed out how their successful collaborations were often supported by technologies that were flexible and easy to adjust to the task at hand, for example people using ‘in-between technologies’ such as text-chat and video meetings. Although the study was a broader exploration of social science fieldwork and collaboration it led directly to the design and development of TagPad, particularly based on two core observations: Our participants often found it difficult to structure fieldwork interviews in a way so colleagues could replicate them or at least conduct them similarly enough for appropriate analysis. Secondly, they found it difficult to conduct ongoing analysis during or right after actual data collection. We therefore developed a tool to support interviewing and early stage analysis.

After the initial development we presented the tool to different researchers and interviewed them about their current practices based in actual projects (Bornoe, Barkhuus, Brown, & Hall, 2011). We found that the strategies for both the data collection and analysis were only prepared on a very general scale. This applied to all aspects of a study from recruiting participants, deciding on interview locations and interview strategies. Mainly a general study design was decided beforehand, all remaining parts would be dealt with ad-hoc. Simple tools were used for both collecting and managing the data. For example, word processing software was often used both during the data collection and the analysis. The use of dedicated CAQDAS tools was uncommon. Particularly in the small-scale studies commonly available software was used. Also price of the software was a factor.

Based on our examination we identified two central elements of the data collection phase. One element is the actual collection when a researcher conducts an interview or observation and saves data such as field notes, audio, video etc. We believe that this phase can be supported with technology, especially, relative cheap tools not requiring a high level of technical expertise. Another element of the data collection phase is the processing and management of the data. This includes organizing, storing, archiving, and preparing the data for analysis. This part of the data collection was found to be challenging and time consuming. By automating some of these tasks, such as a simplifying data uploading, a goal with introducing a tool is to make this part less challenging.

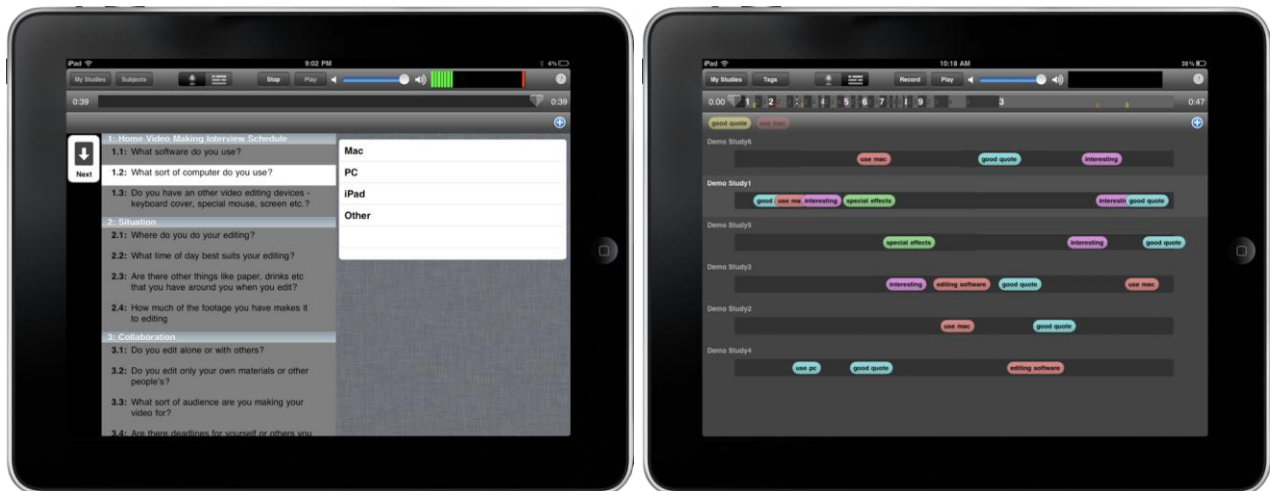


Figure 1. Left: An interview guide is loaded into TagPad. Here is question 1.2 selected. Right: In the analysis view tags can be added to each interview for pre-analysis.

The Design of TagPad

TagPad is an iPad app designed for researchers conducting interview studies. The application can be used for qualitative studies such as open-ended questions or quantitative data collections such as in-person surveys and is designed both for in-person and phone interviews. It's been designed to fit as flexibly as possible with structured and semi-structured interviews. Our aim was to design a “turnkey” multipurpose research tool that easily can be integrated into a diverse set of studies. A design goal was to

make an “off-the-shelf” app centered around simplicity. Further it was an ambition to develop technology that does not require a high level of technical expertise and easily can be implemented in low budget projects. The goal of making a tool that fits as many studies as possible is also a disadvantage because interview studies exist in all shapes and sizes and often studies will have individual requirements. The app is specifically intended to support the data collection phase and also offers the possibility to add tags to the interviews for pre-analysis. With TagPad the idea is to provide a tool that can support research and automat some processes while still offering the researcher flexibility and creativity so it's not the tool dictating the data collection.

Conducting a study is time consuming and complex, and often involves researchers with different backgrounds and skills. We attempted to design TagPad with a limited set of features and options, we also made sure it produces output files in common formats. By automating processes such as a one click upload feature we removed complex tasks. We used a common feature could service for data storage. TagPad can also be used with applications using voice over Internet Protocol (VoIP) services such as Skype making it possible to use TagPad for telephone interviews.

Conceptually TagPad can be divided into three different parts: the TagPad app itself, the platform it's running on – a tablet computer, specifically an iPad, and the integration with a cloud storage service, in this case the service Dropbox.

The TagPad Application

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. TagPad has a simple analysis view for quick analysis to support selective transcription (See Figure 1.). 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.

Studying TagPad in Use

To gain further insights into actual use of the tool we contacted research groups, both local, national, and international and asked if they were interested in using TagPad and if they had any research projects that would be appropriate for its use. TagPad was also made available for free on Apple's app store. Out of the 50+ groups and individuals we contacted, we found eight researchers or research groups interested in using TagPad (See Table 1.). All studies were either in the study design or data collection phase. We interviewed one representative for each study inquiring into the study outline, time frame and which participants they were looking for. We asked how they would organize the data collection, which methods they would use, by what means they would collect the data and which questions they would ask. We also did document sampling where we looked into the interview guides and

instruments used. We looked into both small and large-scale studies, from research teams consisting of only one person conducting 11 – 20 interviews to research teams of 15+ planning to conduct up to 1000+ interviews. Out of the eight studies, six (LCo, EB, AS, RT, LCa, MO) can be classified as small-scale studies with one to four team members completing 10 – 42 interviews. Two studies (IS, JS) are considered large-scale studies with five+ team members and 100+ interviews already completed or planned.

The studies conducted qualitative interviews, quantitative surveys and observations. A mixed approach was common, such as study observations being mixed with interviews. For two of the studies we were also able to observe the use of TagPad in-situ (LCo, JS). For example we spent a full day observing the field site of the JS study, which provided us with valuable insights into their data inquiry constraints. So although these two researchers only conducted one interview with TagPad before we interviewed and observed them, the information gathered here was very useful.

Table 1
Participants

Participant	Position	Study details	No. of interviews with TagPad	Analysis with TagPad	Special circumstances
IS	Tenured professor	Qualitative, ~500 participants	5	Preliminar	Children 9-10 years old
LCa	Researcher	Qualitative, ~30 participants	23	Preliminar	Medical field setting
AS	PhD student	Quantitative survey, 19	19	None	Bars and restaurant
WL	Master's student	Qualitative, 20 participants	7	Preliminar	
JS	PhD student	Quantitative /Qualitative, 1000-1500 participants	1	None	Sensitive setting, rarely will participants accept audio recording
LCo	Post-doc	Qualitative, 11 participants	1	None	
EB	PhD student	Qualitative, 12 participants	4	Preliminar	
MO	PhD student	Qualitative, 42 participants	2	None	

Analysis

We analyzed our interview data through categorization and constant comparison. With mixed data such as audio-recorded interviews, observational notes and meeting notes, a structured analytical comparison was only possible with a subset of the data.

True to our own approach we actually used TagPad to record our own interviews and utilized the question structure to compare answers across participants. We found this analysis method incredible useful ourselves. Our analysis followed traditional qualitative analysis methods in terms of extracting results from rich text data and categorizing these according to relevant issues.

Our goal was not just to evaluate the usefulness of the TagPad application but also to explore the fieldwork practices through the lens of this potentially influential tool. To avoid any confusion of terminology, we use the terms “the researchers” about our participants and “the participants” about their participants in the studies they conducted.

Fieldwork Practices

We first describe how the participants generally had conducted fieldwork prior to being introduced to TagPad and how they would usually record their data. All participants had conducted interviews or face-to-face surveys before, some were also familiar with observational studies. Most had used digital recorders, few had used actual tape recorders and two had used electronic pens which worked as an audio recorder but which also recorded notes taken with the pen, time stamped to the audio. Apart from occasional technical problems the participants were satisfied with their chosen technology. Some had people transcribing the audio for them, others did this themselves and for the surveys, our researchers transferred paper notes to electronic means such as spreadsheets and statistical software for analysis.

Our first experience was that intervening into existing research routines was difficult. As seen in Table 1. only a relative small number of interviews were conducted using TagPad. Several reasons exist: First off in some studies TagPad would be introduced after the beginning of the data collection (IS, WL, JS, MO). Secondly we would conduct interviews with the researchers before the data collection had ended (IS, LCa, JS, MO). Further some researchers found it challenging to implement new technology during a research process. Learning a new tool during the process while also adjusting current routines was a main reason for only using TagPad for a small number of interviews (WL, JS, MO).

The Field of the Field Studies

The participants varied in terms of where they collected their data, some being more focused on 'the wild' than others. Three of the studies we looked at were simple interview studies conducted in fairly regulated places such as offices, cafes or outdoors. Other researchers had to seek out their participants in the relevant environment. One study of illegal immigrants for example, was conducted in homeless shelters just across the Mexican border where the target participants were staying. Another study took place in the hospital wards because observation of clinicians' behavior was part of the data collection and the main interview was conducted right after a ward-round in relation to what the researcher had just observed. To all participants TagPad was their first integrated recording and analysis tool they encountered.

Experiences with TagPad

We now continue describing our participants' experiences with TagPad. Our focus is not on the usability of the system but instead on what the use of TagPad contributed with or how it affected the studies as well as how our participants were able to adapt it to their specific needs and use, or how they found this difficult. The aim with this description is to be able to conclude on a broader level what type of technologies can be used for interviews and more general data gathering.

Affect on Interview Structure

A defining feature of TagPad is that the audio file and hence the interview is cut into bits according to the interview schedule's questions. Seemingly flowing and very open-ended interview guides will therefore be forced into at least some sort of structure and we expected researchers who used this approach to perhaps find it constraining to structure their interview more tightly. When interviewing them, some of them in fact expressed such worries but all but one had overcome them. IS for example felt that it was a good way for her to actually stay with the interview guide and felt the interviews became better. She says:

"Yeah, if anything I was worried that (TagPad) would force me to be too structured. But, especially with children. But I'm fine, we go around, I jump from question to question, because I have these chunks, I categorize these chunks with big headings, I mean with what you would do with any interview. (...) No problem (...) and it is actually making it much easier."

A researcher who had already conducted a number of interviews with a regular audio recorder before adopting TagPad, (WL) on the other hand gave up on advancing the questions through selection with her finger during the interviews, and simply did not use the audio bits but instead transcribed the master audio file that TagPad also saves. She reported that she had her interview questions memorized and therefore rarely even looked down at the questions.

More broadly, TagPad worked well with semi-structured interviews, with emphasis on structure. We found that it was essential to have a system that was flexible in terms of being able to 'roll back' to previous work practices. With TagPad it was possible to simply use it as an audio recorder, all the participants' previous tool, in case the forced structure did not fit the data collection situation. But in addition it was an improvement for some of the researchers who found the enforced structure helpful.

Setting Issues

The nature of fieldwork means that data collection takes place in a diverse set of environments and our participants collected data in a multitude of different settings with different effects. Only three of our researchers (LCo, EB, MO) were able to use office settings or settings with a proper table and chair (such as outdoor cafe seating or a common area) for all their interviews. They expressed that there were very few differences in regards to the setting from their earlier interviews, for fairly obvious reasons. The main distinction was that EB had been using a digital pen before and took notes during the interview but now used the iPad; after initial getting used to the new input method, she actually did not feel there was any significant difference regarding the interview setting.

Two researchers (WL, AS) collected data in semi-controlled environments: cafes, restaurants, the beach and other public venues. Here they would often sit on the ground, stand up or even walk around a bit with their participants, increasing the challenges for audio collection and note taking. One factor for a researcher was the monetary value of the iPad; she was not excited about using it on the beach where it might be dropped and sand get into it. For these two researchers though, the iPad generally had a good format; it acted as a notepad with a natural purpose in the setting.

Three of the researchers worked in complex settings that all affected the use and their abilities to use TagPad. One researcher for example collected data at a hospital on a 13 hospital ward, following the medical staff around and recording their activities. She found that TagPad worked really well because people were using clipboards already and she was just yet another person in the room with a notepad. LCa explains how she blended in:

"Because wards are a very busy environment and very challenging to observe in. It was a tool to make me focus well. (...) (E)veryone is carrying clipboards and writing and all look down. And to have something the size of an iPad made people not think to much about it, it made people ignore me because I was doing like everybody else. They weren't really thinking of me as threatening. It allowed me to blend in in more ways than one."

This particular setting strengthened the legitimacy of the presence of an iPad and it was not until people noticed it was an electronic notepad and not a paper notepad that they took note and commented on it. It enabled more natural interactions according to our researcher. This example contrasts another study that we followed and in where they used TagPad. This was a large cross-university research study of illegal Mexican immigrants and their experiences with deportation. The method of recruitment meant that researchers spent significant time (several full days per week) at homeless shelters just across the Mexican border and interviewed deported people there. Their previous data collection instrument was paper surveys, which the interviewer filled in, but because this was 30 pages long (with many conditioned questions). They were keen to adapt and transfer the survey to TagPad.

The authors of this paper assisted in transferring the instrument in order to help them along and they acquired several iPads for the study. We followed three researchers to the shelters for one day to observe and assist if any problems arose with TagPad. However, the setting of the study was too complex and what might seem natural in a rich country (using state-of-the-art technology) can be out of place in poor settings with frustrated people. The majority of the participants recruited that day refused to be audio recorded, which is understandable considering their situation but more importantly the researchers reported, and our observer observed, the presence of the iPad was so out of place and seemed intimidating to the participants that they had to take it away. In the end one interview was conducted using the iPad and our interview was with the researcher who conducted these interviews. What is interesting in this situation is that the researchers themselves had not predicted this problem of the inquiry environment being so sensitive to the presence of an iPad. The researchers had all taken the trip several times and were 1/4 through their data collection, yet it was not until the actual situation that they realized the problems and the obstacles that the technology also presented in such sensitive environment.

Participants

The most important part of the fieldwork setting is of course the participants themselves and as we exemplified with the participants from the study of illegal immigrants, their sense of security and comfort means everything for a good interview and data collection. In one study (WL) the researcher reported that TagPad resulted in slightly less eye contact than for example a traditional audio recorder, which was imperative to the nature of her interviews that addressed a very sensitive topic. She explains the diminished eye contact:

"I would prefer just to have a conversation. (...) (B)ecause I am focused on (TagPad) as opposed to a piece of paper where you are just glancing at it, you know, making mental notes in the head because you're touching this, I feel (...) it takes away the attention for sure, and I don't like that 'cause I just want it to (...) have everything in my head."

For other researchers the eye contact was not a problem because of the training they had as interviewers. It did result in missed advances of the questions with the resulting non-clipping in the audio file but for the ones where this happened, they did not view this as a problem because this simply mirrored their previous practices. One researcher (IS) explained how she was able to effectively integrate TagPad into her interview sessions:

"...it took me one interview of having it sitting there like a microphone before I realized I don't have to do that. It can be less intrusive, it can be part of me and not part of the table."

Collaboration

Only four of our eight researchers were collaborating with others on their study; they had obviously all collaborated around research before, but for three of them this particularly study was conducted individually, either as part of their individually funded project or as a Masters project. For the studies where more than one conducted the interviews, the forced structure showed useful for sharing data and analyzing results. However, this issue of fieldwork was not looked at in detail in our study of TagPad.

Early Coarse Level Analysis

One of the core features of TagPad was its option for early coarse level analysis, which was assisted by the interviewer creating tags, either ahead of time or on the fly, and adding these to the interviews at specific points in the audio file. When viewing the interview in the TagPad analysis view, it was possible to scan for tags and listen to the bits that were relevant for a particular tag. Although only a subset of the researchers has tot to the stage of analyzing their data with TagPad, most had the option of

this early stage analysis or 'looking' through their data. One researcher (LCa) found it very useful to use the tagging to further develop the interview guide and adjust the next interviews. If a couple of interviews had received a particularly high number of specific tags, she knew that this was an area that was important for her study and she could push for that topic in subsequent interviews. As TagPad was not developed for the purpose of extensive analysis we did not expect our researchers to have conducted much analysis that was distinct to their use of TagPad, instead we hoped that they would make use of the separation of audio later on when searching for specific answers to specific questions. However, at the stage of our inquiry, none of our researchers had reached this part of their study.

TagPad as a 'new technology'

A feature of all new technology and new approaches to established practices is a time of transition where both technologies are often used. Some of us remember the times when record players were lined up next to CD players and many early CD players came with built-in cassette players (the comparison might be unfair because of the cassette tape's ability to record music in contrast to a CD player, but the example should be illustrative enough). TagPad was to all our researchers a new technology and to some, the iPad itself with its touch screen and gesture based interaction, was also new. This meant that only few had the courage to do interviews solely with TagPad the first times they used it. The common approach was to use the old recording method (tape recorder, electronic audio recorder, note pad) concurrently with TagPad as backup in case of potential technical failure. The main issue is that data collection settings are highly sensitive situations; the researcher has spent a lot of time recruiting and getting the participant and in some instances the participants are taken from a limited pool of potential participants. Missing out a data point can prove crucial to the success of the study and can in most cases result in extra time spent on the project.

Implications for Fieldwork Interview Technologies

Our goal with developing and deploying TagPad has been to provide social science with an assisting tool for qualitative fieldwork, particularly interviewing and surveys. We studied the use of TagPad to gain insights into structures that might affect adoption of such tool and to inform us of further design guidelines of research technologies. We highlight three issues that were apparent after studying TagPad among social science researchers:

1. We found that with new technologies, flexible back-rolling is important in the case that the new method or technology does not work as intended. In our study it helped both researchers who felt the interviews became too structured for their setting and at the cost of intimacy with their participants, and it helped when the technology simply did not work as they had expected. The point is not new in terms of technology adoption, many other technologies rely on easy 'roll back' function such as software that can be set to a previous edition for opening older documents, but this is an important point to make in a social science fieldwork setting. For our researchers, participants were 'expensive' to recruit in time and effort and any lost data resulted in major frustrations. They did not have an infinitely pool of participants to take from and it was necessary to have options that might not be state-of-the-art inquiry systems, but at least reliable data collection methods.

2. Secondly we found that each research setting is unique and unpredictable. Trying to use a new inquiry technology is always an experiment and it was apparent that in some cases it did not fit into the setting. Instead the researchers had to find other possibilities for data inquiry and in some cases roll back to previous methods. It is not surprising that some settings work with a new tool where others do not, but we pointed to a set of unpredictable factors such as the perceived alienation that the tool contributed to and a sudden sense of value of the system, which resulted in a higher level of sensitivity towards using it in the setting such as the beach where it might get sand into. The tool also promoted eye contact in some situations but almost prevented it in other setting depending on the researcher's previous experience and perception of the situation.

3. Finally, the researchers benefited from early stage analysis, which they had not been able to do before without listening to the full interviews and writing notes. A tool that can contribute to more detailed and deeper analysis (taking for granted that the early stage results in better and more thorough later analysis) is highly beneficial to social scientists of the type we interviewed and will likely assist in further result generation in the future.

Conclusion

With TagPad, we have developed a potentially beneficial and useful cyberinfrastructure tool for social scientists, an area that has not been addressed as much in as the natural sciences. Our evaluation indicated not just general usefulness but also illustrated how users were able to adjust the tool to their specific study. We believe an app such as TagPad can help streamline and organize the data collection process, making it both easier and less complex to collect data and distribute it. We aim to continue our development and studying of TagPad as well as other research technologies in order to fine-tune more development guidelines for such hopefully useful tools.

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