

Making sense of qualitative results: a systematic approach

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In a fast-paced business environment, with short research turn-around times, quick-and-dirty analyses of a limited number of focus groups is all too often the norm. The demand for qualitative research has grown and changed in recent years, and in many instances greater rigor is required in the analysis than has typically been practiced by most market researchers in the past. We have borrowed some best practices in the systematic analysis of large qualitative data sets from the academic social sciences. Using systematic analytical methods requires slightly greater forethought in data collection and analysis, but in the end ensures a higher quality deliverable for the client.

Market research and qualitative analysis

Beyond focus groups, market researchers increasingly rely on an array of qualitative research techniques including large-scale in-depth interview studies, online threaded discussions (Downes-LeGuin et al. 2002), web logs, and ethnographic studies. Some of these efforts span multiple segments, diverse geographic locations, and include data collection efforts of many researchers, making “seat-of-the-pants” analyses less tenable; such large complex studies demand more rigorous and systematic treatments of the data than smaller qualitative studies do. A lone researcher who has done a limited study may have little trouble managing a small focused data set using conventional methods, but when one engages in data collection efforts in several countries, across many customer segments data management becomes central to delivering a quality analysis.

While there are numerous computer-based software tools available that are designed specifically for use in the academic social sciences to assist with analysis of qualitative data, such as Ethnograph, Atlas/ti and Nud*ist, none of them fully automates analysis of the data for the researcher, nor would this be desirable. The best of these tools typically facilitate database building, enable assignment of coding schemes to the data, and allow quick retrieval of interrelated data. Although such tools are available, many researchers use simple computer tools like Word and Excel to accomplish some of the same tasks that are handled by specialized software packages, and others, like us, use customized databases which enable a degree of flexibility not provided by commercially available packages.

Among qualitative social scientists, a debate remains over the legitimate use of any software to aid in analysis of qualitative data (Roberts and Williams 2002). Purists maintain that such software may distance the researcher from the data, and predispose him or her to analyze the data out of context (Seidel 1991), and furthermore, because computer methods rely heavily upon categorization or coding of the data, some think coding may be done at the expense of some of the more powerful interpretive and hermeneutic analyses that characterize many forms of qualitative analysis (Lonkila 1995). Another risk sometimes cited is that one may be more likely to quantify qualitative data inappropriately when it is

entered into a format that allows it to be cross-referenced and counted so easily (Mason 1996).

With or without a computer, the onus of doing good analysis is on the researcher. To do thorough in-depth qualitative analysis, researchers must have enough familiarity with the data to organize it meaningfully to begin with. With or without computer-based tools, data analysis will always require the tedious and often enjoyable process of combing through data. The computer facilitates management of the data, but does not analyze it.

Using structured and systematic approaches to analyze data, as is now done using the computer, is nothing new to the social sciences. Manual methods for data analysis are in fact what have served as the models for the development of computer tools. These methods include the use of note cards, which can be rearranged, transcripts and notes that can be marked and cut up, the use of grids for laying out data in relation to each other, and so forth. Most qualitative approaches in the social sciences demand the kind of rigor facilitated by the computer. For example, grounded theory (Glaser and Strauss 1967), used by many ethnographers, content analysis (Berelson 1952, Holsti 1969) and socio-linguistics are among some of the approaches that have benefited most from the computerization of qualitative data management. There can be no doubt that the benefits to using a computer to facilitate data management and handling of large complex qualitative data sets far outweighs the risks associated with using it.

In addition to the obvious benefits of allowing researchers to categorize and search data easily, using a computerized method to assist in data analysis allows them to look at data from many angles: in context, by topic, and in relation to other participant characteristics. Some other significant advantages to computerized methods of data analysis are:

- Facilitates note taking in the field.
- Simplifies transcription of field notes.
- Facilitates correcting, extending, or revising field notes.
- Allows indexing of varied types of data including audio, video, photos, and text in an organized database.
- Allows researcher to interrelate data that they might not have ever seen at one time.
- Enables collaboration in note development, memos, so that multiple people can contribute to a database, and all view the same data.
- Enables content analysis: counting frequencies, sequence, or locations of words and phrases for research topics where appropriate.
- Allows quick report generation, for illustrating how particular analyses were made.
- Facilitates the process of writing and preparing interim and final reports.

Below, we describe our approach to doing systematic data collection and analysis using customized databases. We illustrate our approach with two examples, including a case study of a project we did with Intel.

A systematic approach to data collection and analysis

We do not use specially designed software, but we do use custom-designed databases to facilitate in the analysis of large-scale studies. We build our databases using Microsoft Access, a tool that most people who are using PCs in a business environment have at their

disposal. The specific software we use is to some degree irrelevant, except that because it is a widely available general-purpose database tool, we can tailor input forms to the projects we are doing, and deliver a customized searchable data set to our clients without their needing to purchase or own specialized software. In addition to the analyses we perform, our clients have access to a categorized data set that lets them look at research findings from different perspectives long after the research project has been completed.

We have used databases like these for in-person in-depth interviews, telephone-based in-depth interviews, and for the organization and analysis of disparate data sources. We have built databases post-research, and also pre-research to facilitate data entry during data collection. Below, we discuss the mechanics of putting a database together, pre- and post-data collection. This is followed-up with a discussion of how we used this approach in one project that Doxus did in partnership with Intel.

Depending on the nature of the study, one can create a database structure either in advance or after the data collection phase. If the research process will be a fairly structured one, in which each participant will be asked a limited set of open-ended questions about a focused domain, then it may be useful to create the database in advance of data collection. There are two circumstances in which this is highly desirable: the first, when the interviews will be conducted by telephone and the researcher can enter notes as the interviews are conducted, and the second, when there is a back-room note-taker available during in-facility interviews.

Example 1 illustrates an entry-form from one such world-wide design study we did.

Section 1 - Introduction

ID	Docus ID	County/City	Name	Total # Employees	# Employees @ site
13	1307	GA/Atlanta	John	25	25

Company (only owner)	Accountant?	Title	IT department?	IT member?
Product Manager/Team	No	VP Business Development	Yes	No

Daily responsibilities

John is minority owner of the company, primarily responsible for business development.

Company background

The company is 50 man/hr old. We do a mortgage brokerage, doing purchases and refinancing of real estate.

1-Introduction
2-Landscape
3-Design Lang
4-Prototype Test

Example 1: Illustrates pull-down boxes at the top as well as open-ended entry boxes. The right-hand side has navigational buttons for moving from one part of the guide to another.

for analysis, and most importantly makes it possible to do a more thorough and systematic job.

Pros and cons to creating database in advance of data collection phase:

Pros	Cons
<ul style="list-style-type: none"> • Provides a clear structure for the note-taker to follow. • Makes entry of predictable, discrete responses faster. • Reduces time in transcription of notes. • Faster turn-around time at end of project. 	<ul style="list-style-type: none"> • Might have to re-design database “on the fly” to accommodate changes in the research design. • Pre-defined categories might not be the right ones. • Often the data has to be entered in big “chunks” that require a lot of back-end reorganization anyway.

In some cases, it is impossible to create a database until after one has collected the data. If, for example, one is doing a large ethnographic study in which many disparate types of data will be collected and recorded, and the research is highly exploratory, it will be nearly impossible to build a database and supporting entry forms in advance of the study. For one thing, the categories in this type of study will emerge from the research, and can not be pre-defined. In other cases, as in the case study we present below, you may not have time in advance of the research to design a data entry tool and database. Each approach has its advantages and disadvantages. Building the database after the data has been collected gives one greater control, but it can be tedious to enter the data, and it adds a lot of time to the analysis process.

Pros and cons of creating database post- data collection:

Pros	Cons
<ul style="list-style-type: none"> • Gives greater control over database design. • Categories can be finer grained. • More likely to identify emergent categories. • Less likely to constrain analysis by pre-defined analytical categories. 	<ul style="list-style-type: none"> • Tedious data transfer, transcription process. • Slower turn-around time at end of project

A case study: worldwide study of mobile application developers

Overview of the study

In mid-2002 Doxus and Intel conducted 92 in-depth interviews by telephone in ten countries with mobile application developers in North America, Europe, and Asia. The interview focused on how developers make decisions about client- vs. server-side development, how they handle varying degrees of client capabilities, and what would most benefit future development efforts. We recruited mobile application developers from six different industry segments, and participating developers used a variety of programming languages and developed software for several different mobile devices including cell phones, PDAs, and pagers. Intel wanted analysis of the interview data by segment, country, region, device, and programming language used.

Aside from the fact that there was not enough lead time to put together data-entry and to design a databases in advance, the research was conducted in several different languages, which would have made it even more difficult to have a data-entry tool available to all of the interviewers. In other respects, however, this study would have been well suited to having had the database and data entry forms designed in advance: the interviews were phone-based so the interviewer could have typed notes on the fly, and they were structured—the same topics were covered in every interview.

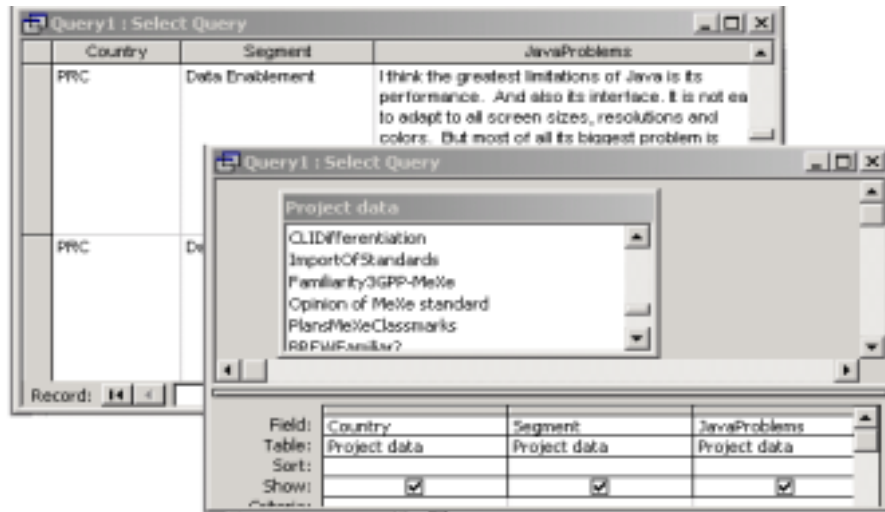
After the interviews were completed, given the scope of the research and the depth of analysis required, we decided to create the database to facilitate analysis. We began by looking at the guide, transcripts, and thinking about what different “views” of the data we would need to answer Intel’s research questions. The first iteration of the database consisted of a combination of screening data, transcriptions and notes for each person. As analysis proceeded, we added categories and shifted and copied data to appropriate cells in the database. Example 3 illustrates the database in tabular format.

FutureSoftware	FutureCarrierServ	FutureHardware
Well, definitely common APIs and better data transfer speed, those are what spring to mind immediately, that would be really useful. Those are probably the most important in my opinion, even if there are always things that could be made better... /Well, costs in general are too high. For example, we "subscribe" to music from our carrier, you get the new versions of programs, support.	Mobile communication needs to be made better. The network needs to be expanded, transfers faster. You should be able to use [our product] in all kinds of places, airports, etc, through wireless networks, so that you can access your computer and what you need to do your work. More network expansion /needs are beginning to be used in Swedish now, so more of that if possible.	Oh, better life needs to be made better! It's just pathetic the way it is today, at least the ones we work with. They last perhaps 1-2 hours, and that kind of defies the purpose of our product, you can't really do anything anyway that way... That something that really needs to change / Bigger non-memory would be great, I think the hard drive is enough, but more RAM/network would be better.
I don't know much about handwriting and voice inputs but 3D graphics, Audio processing and data transfer speed would be very beneficial. In terms of 3D graphics, I believe that the environment where CG is created and reproduced on the client is suitable for mobile phones. If data transfer speed is increased, there will be a time when these images are transmitted like TV and	With the introduction of applications like animated email the use of micro-payments have been achieved. I believe this is the reason for the success of Japan's content. Location-based services have also begun with GPS. I think multimedia communication is effective. After all, mobile phones are a communication tool as they connect people. The more effective or	We should pay attention to security in the future. Basically, as the carrier acts as a gateway the level of system security is high. But in the future when mobile phones take the place of the individual's wallet (certification chip installed and shopping made with iris-recognition), security will become extremely important. /What is important in the first place is the concept
I hope there will be a unified platform. It's like Microsoft on PCs. One single platform can do. Then we'll save time not to repeat our work (become easier for attachment/printing of the same application). /3D graphics improvements? Not useful to us. /Audio processing improvements? Same. /Data transfer speed improvements (eg USB2.0)?	[JDOT] Yes. For some clients, which have higher requirements. [Payment systems?] Our company is also providing this solution as one of our tests of business. [MMS?] Very important in the future. Clients will demand this.	Smaller size of PDA with large display. Large display is important. Because our application needs to display a lot of data. If it takes 7 or 8 screens to show one single piece of info, it's very clumsy. And you have to consider also input. So it will use a lot of "text" to complete me search.
Right now you have to choose one side or the other. MS is not going to support Java, and we are not sure how that will affect us. I guess I would like to see better platform support.	Not a big part of our business concerns.	More universal display base access devices. Bigger screen size.

Example 3: What the data-base looks like. Here you can see bits and pieces of transcripts and notes categorized.

Once all of the data had been entered, we were able to easily run queries, and sort data according to country, region, segment, and so forth, allowing us to see any subset of data and its relationship to other pieces of data in a matter of seconds. Were it not for the database, accomplishing this with the use of conventional methods—printed paper, highlighters, and word processing searches—would have taken enormous time and effort, and would not have been as thorough.

Example 4 illustrates one such simple query.



Example 4: The ability to easily query, sort, and filter the data makes looking at the data from many angles much easier.

Building the database and getting the data into it took us about a week, but we saved at least three weeks in what would have otherwise been spent hunting down quotations and relating data from different transcripts and notes. Not only were we able to meet a challenging analysis schedule, given the magnitude of the study, but we came out ahead in the rigor and depth of the analysis.

Regardless, of when and how the database is designed, a searchable qualitative database can itself become a valuable deliverable for the client. After we finished this project, for example, we turned the database over to Intel, so they could continue to “ask questions” of the data after the project closing.

From the client perspective—in her words

Advantages:

The database made it easier to meet the needs of multiple internal clients. This study was a broad-based study which had three different internal sponsors. As is common with "multi-client" studies, there were several "threads" in play and the guide was a mix of closed and open ended questions. When it came to doing the analysis, we ended up creating multiple versions of the presentation targeted to individual audiences and stakeholders. The database enabled me to easily go back into the data set to answer questions specific to one group's interest. This, in all likelihood, would not have been possible just looking more broadly at the key themes and trends that typically result from qualitative research studies. The database enabled me to quickly and easily isolate the interviews of developers who were doing very specific types of software development.

Using the database extended the life of this market data. From study to study it seems like I hear many of the same things over and over again. It would be great if I had a way to capture and organize all the feedback from respondents over the course of time. This technique [of using a customized database] if applied more broadly, would lend itself well to doing that. This study, for example, has lived a long life and we are still referring back to it over a year after its completion. Having easy access to the raw data is what has extended the usefulness of this study. I wish I had other qualitative studies in this format because I would refer back to them more often than I am able to now.

The database allows the client to develop a closer relationship with the data. In this case, it was not feasible for me to be able to participate in very many of the interviews. I listened to some of the US tapes, but for obvious reasons of not speaking the languages, was not able to listen to the international interviews. In the beginning of the project, I had summary notes forwarded to me after each interview. I read each one, but after interview 50, it was becoming unwieldy. I didn't have a good way to organize what I was getting mentally or physically. Soon after, I received access to the database, which was much easier for me to review and read through. It allowed me to look at multiple interviews simultaneously and hone in on specific questions or threads. The benefit to me was that I was able to be in touch with the raw data which is important because I am the internal face behind the study for my clients. I am expected to have a deep knowledge of the data.

Caveat:

The data contained in the database might get misused were it to fall into the wrong hands. In an ideal world, it would be great to have this kind of tool available for my peers. However, I have been guarded as to how much I share the data with others because I fear they would treat the data too much like quantitative data. Since you can "count" and tabulate, there is always the temptation to do more with the data than was intended from the beginning. Unless your team has a very good understanding of how to use qualitative data, I would limit the access to such databases to those trained to do qualitative analysis.

Conclusions

From the client perspective this approach is a win: made it easier to serve the needs of multiple clients, extended the life of the data, and allowed her to get a better handle on the data collected during the research.

From the research perspective, it matters little whether one enters data during the research process or after the research process when it comes to the quality of the analysis. Ultimately, the quality of the analysis will rest on the quality of the data and the experience, skill and knowledge of the researcher analyzing it. Regardless of approach, the analytical process will be approximately the same: Collection of descriptive data→Entry into DB→Categorization→Analysis, interpolation, and inference-making.

You should consider using a database to analyze qualitative data when...

- The project promises to generate a large unwieldy qualitative data set.
- The driving research questions will require that the data be scrutinized from many different angles—geography, segment, and/or other criteria.

You should consider creating your database framework and data-entry forms in advance of data collection if...

- You have adequate lead time and resources.
- The research will be highly structured, same questions asked over and over again in roughly the same order.
- You will have a note-taker in the backroom, or the interviews will be done by phone.

You will want to create your database post-research if...

- You will be using an inductive and flexible research method, like ethnography.
- You anticipate a lot of changes in the research plan—for example, using an iterative design approach.
- You don't have adequate lead time.
- Your research will be conducted in many different languages and creating a database in those languages is not feasible.

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