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DATA ANALYSIS TECHNIQUES IN QUALITATIVE RESEARCH

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The explanation of how one carries out the data analysis process in qualitative research is an area that is sadly neglected by many researchers. This paper presents a variety of data analysis techniques described by various qualitative researchers, including LeCompte and Schensul, Wolcott, and Miles and Huberman. It further shares several activities used to teach qualitative data analysis techniques to students of qualitative research methods.

Introduction

Since the 1976 Sieber study, which found that less than 10% of the pages of frequently used qualitative textbooks discussed the topic of data analysis, more recent texts have taken care to elaborate on the methods used to analyze data (Huberman & Miles, 1998). It is important for qualitative researchers to have the opportunity to share the techniques they use to analyze data to add more options to our repertoire of techniques or to refresh our skills in conducting research. The purpose of this article is to discuss a variety of ways that qualitative researchers analyze data and to share techniques for teaching data analysis to students enrolled in qualitative research classes.

There are many different techniques for analyzing qualitative data. Novice researchers may feel overwhelmed by the variety; however, it may be helpful for them to understand that there is no prescribed way to address the process. The ways that they choose to analyze data should stem from a combination of factors, which include the research questions being asked, the theoretical foundation of the study, and the appropriateness of the technique for making sense of the data. Analyzing qualitative data typically involves immersing oneself in the data to become familiar with it, then looking for patterns and themes, searching for various relationships between data that help the researchers to understand what they have, then visually displaying the information and writing it up. There are more techniques for analyzing data than are presented in this article. Further, this article does not address the software available for assisting the researcher in the data management and analysis processes. Today's computer age has provided a variety of software to help qualitative researchers. The software has enhanced the qualitative researcher's ability to distill massive amounts of data in a much shorter time than was possible without its use. Software provides a useful tool for organizing data, in particular. There are a variety of software programs available which augment the coding and analysis of data from text, audio, and video sources. Whether one chooses to use the assistance of computer software, the same processes for analyzing data should occur. Using a variety of techniques enables the researcher to make appropriate connections that explain the full story being told.

The citations used in this article are only a few of the available sources that provide a discussion of analysis techniques. They were selected, because they are a few of the ones I use in teaching data analysis. Student feedback has influenced me to continue to use these sources as teaching tools, as the

sources cited herein are well presented, are easily read and understood by students, and, to some degree, provide an overall view of qualitative data analysis.

What is Data Analysis?

LeCompte and Schensul (1999) define analysis as the process a researcher uses to reduce data to a story and its interpretation. Data analysis is the process of reducing large amounts of collected data to make sense of them. Patton (1987) indicates that three things occur during analysis: data are organized, data are reduced through summarization and categorization, and patterns and themes in the data are identified and linked. LeCompte and Schensul (1999) suggest that data analysis be done as data are collected in the field, as soon as possible after the data have been collected, both while the researcher is still in the field, and later, when the researcher is no longer in the field. They describe in-the-field analysis as including inscription, description, and transcription. They also suggest that analysis may be conducted in both a top down fashion and a bottom up fashion.

Approaches to Analysis

Merriam (1998) discussed several approaches to data analysis, including ethnographic analysis, narrative analysis, phenomenological analysis, and constant comparative method. Ethnographic analysis involves identifying categories related to a culture's economy, demographics, human life, particularly family, education, and health care issues, and the environment. She describes narrative analysis as it is used in several fields of study. For example, sociological/sociolinguistic models relate narrative to the social context. Psychological approaches focus on memorization in storytelling, with particular emphasis on understanding, recall, and summarization. Anthropological models emphasize how stories vary across cultures, looking at customs, beliefs, values, and social context of narratives. Literary models focus on grammar, syntax, and plot of narratives; ideological perspectives, like feminist theory, critical theory, and postmodernism, may be used to analyze and interpret narratives. Phenomenological analysis includes an epochal approach, which involves laying out one's assumptions about the phenomenon under study, bracketing, imaginative variation (looking at the phenomenon in various ways), and first and second order knowledge. Constant comparative method assigns codes that reflect the conceptual relationships (Merriam, 1998).

Bernard (2000) also suggests several approaches to data analysis, including hermeneutics or interpretive analysis, narrative and performance analysis, discourse analysis, grounded theory analysis, content analysis, and cross-cultural analysis. In hermeneutics or interpretive analysis, the researcher "continually interpret(s) the words of those texts to understand their meaning and their directives" (p. 439). The focus of narrative and performance analysis is to discover repeated similarities in people's stories. Discourse analysis involves looking closely at how people interact with each other. Bernard describes grounded theory as "a set of techniques for (1) identifying categories and concepts that emerge from text, and (2) linking the concepts into substantive and formal theories" (p. 443). In content analysis, Bernard presents a more quantitative approach to data analysis by creating codes, applying the codes to texts, testing the

intercoder reliability when more than one coder is used, creating a matrix or table of units of analysis by variable, and conducting statistical analysis of the matrix. Cross-cultural analysis emphasizes the application of codes found in the Human Relations Area Files (HRAF) at Yale University. The approaches to analysis presented by Merriam (1998) and Bernard (2000) are illustrated in Table 1.

Table 1

Approaches to Analysis Presented by Merriam (1998) and Bernard (2000)

Author	Approaches
Merriam (1998)	Ethnographic Analysis Narrative Analysis Phenomenological Analysis Constant Comparative Analysis
Bernard (2000)	Hermeneutic/Interpretive Analysis Narrative/Performance Analysis Discourse Analysis Grounded Theory Analysis Content Analysis Cross-cultural Analysis

Coding and Category Guidelines

While the emergent design of qualitative research lends itself to analyzing data as it is collected in the field, there are certain tasks that must be accomplished before in-depth analysis can occur. Coding of transcribed data from interviews and field notes, for example, is an initial step in this process. Merriam (1998) describes the process of data analysis as being a complex action of moving back and forth between data and concepts, between description and interpretation, using both inductive and deductive reasoning. Merriam also describes Glaser and Strauss' (1967) grounded theory approach, constant comparative method, in which categories, properties, and hypotheses are used to provide conceptual links between and among categories and properties. Constant comparative method is used to analyze data by assigning codes that reflect various categories and properties to units of data through sorting them into groups of like substance or meaning. Categories should:

- reflect the purpose of the research,
- be exhaustive,
- be mutually exclusive,
- be sensitive to category content, and
- be conceptually congruent (Merriam, 1998).

The number of categories used should be guided by the frequency of mention by participants, the audience for whom the study is conducted, and the uniqueness of the category (Guba & Lincoln, 1981).

The coding process generates categories that must be fleshed out by seeking relevant data bits that inform the category. Boyatzis (1998) stated that a good code has these five elements: (1) a label (i.e., a name); (2) a definition of what the theme concerns (that which characterizes the theme); (3) a description of how to know when the theme occurs (those aspects that let you know to code a unit for that theme); (4) a

description of any qualifications or exclusions to the identification of the theme; and (5) a listing of examples, positive and negative, to eliminate confusion. The label should be developed last and should be conceptually meaningful, clear and concise, and close to the data.

There are several approaches to the coding process. For example, theory driven coding begins with the researcher's theory of what occurs and the formulation of the indicators of evidence that would support the theory. The elements of the code are derived from the hypothesis or the elements of the theory. Prior research also is used to develop coding schemes. Research driven codes are those used by others, and their findings provide the most direct help in developing codes from prior research. Using someone else's codes may require that one look at inter-rater reliability. A third approach to coding, data driven coding, involves inductive code development based on the data collected in the study on which one is working.

Data are analyzed on an ongoing basis. The constant comparative method of data analysis is typically used for theory building, but is appropriate for much of the inductive data analysis that takes place in qualitative research. This method involves transcribing all data sources, including field notes, into raw data. All data transcriptions should be photocopied with originals stored in a safe place, unaltered. Photocopies of raw data are then used for analysis (Strauss & Corbin, 1990).

Strauss and Corbin (1990) provided direction for researchers to develop grounded theory using three types of coding: open, axial, and selective coding. They contend that concepts are the building blocks of theory. Open coding is the process by which concepts are identified and developed in terms of their properties and dimensions. This includes asking questions about the data, making comparisons for similarities and differences between incidents, events, or other phenomena. Similar ones are grouped to form categories. Axial coding is the set of procedures used to put data back together in different ways after open coding, by making connections between categories. This is achieved through use of a coding paradigm that includes (intervening) conditions, context, action/ interactional strategies, and consequences. They describe axial coding as the process of relating subcategories to a category, which is developed in terms of the causal conditions that give rise to it, its dimensional location in terms of its properties, the context, the action/interactional strategies used to handle, manage, and respond to the phenomenon in light of that context, and the consequences of such action. Selective coding is the process of selecting the core category, systematically relating it to the other categories, validating those relationships, and filling in categories that need further refinement and development. The core category is the central phenomenon around which all the other categories are integrated (Strauss & Corbin, 1990).

It is important to identify patterns and to group the data accordingly, because this is what gives the theory specificity. One is then able to say: Under these conditions (listing them), this happens; whereas under these conditions, this is what occurs. Once the data are related not only at the broad conceptual level, but also at the property and dimensional levels for each major category, one has the rudiments of a theory. Validating one's theory against the data completes its grounding.

The process of coding data includes looking for patterns and themes. DeSantis and Ugarriza (2000) defined a theme as "an abstract entity that brings meaning and identity to a recurrent experience and

its variant manifestations. As such, a theme captures and unifies the nature or basis of the experience into a meaningful whole" (p. 362). They suggest that a theme involves five aspects:

1. the overall entity or experience;
2. the structure or the basis of the experience;
3. the function or the nature of the experience into a meaningful whole;
4. the form or the stability or variability of the various manifestations of the experience; and
5. the mode or the recurrence of the experience.

They also elaborate on the four criteria they believe to be fundamental to defining themes: the theme's emergence from data, abstract nature, iteration or recurrence of patterns of behavior, and levels of identification (which would include categories, domains, or taxonomies).

Analysis Issues

Qualitative researchers have shared a variety of strategies used to analyze qualitative data. For example, to analyze data, LeCompte and Schensul (1999) suggest:

- looking at the theoretical framework. The theoretical underpinning provides the lens through which the data are viewed and helps the researcher to situate the results in the theory, which helps to facilitate the understanding of the data within that theoretical perspective.
- reviewing the research questions. The research questions in qualitative studies are used to guide the design and implementation of the study. They are the questions one wants answered by the study; hence, it is important to view the data in terms of ensuring that sufficient data were collected to enable the researcher to answer the questions posed within the study.
- creating vignettes. These snapshots provide an overview or summary of data, encouraging the researcher to organize the data into smaller segments that help to develop understanding.
- writing some history. The background and history of the topic under study is important in assisting the researcher to interpret the data. In many studies of cultures, for example, it is important to understand the past as a tool for understanding the present.
- describing a social process. Watching how participants interact is sometimes an excellent tool for helping the researcher to understand data that have been collected through observation. What talks to whom? What are the relationships among the participants being observed?
- creating summaries of interviews or survey results. Peer review is an effective way to help researchers begin to make sense of the data by encouraging the researcher to summarize what has been found thus far.
- creating collections of quotations. Organizing quotations related to the same topic can help the researcher to recognize patterns found in the data.

- creating a conceptual framework and drawing it. Providing a visual that encompasses the concepts one has found may be helpful to foster understanding of the data.
- writing in a narrative form. Sometimes just sitting down and beginning to write is a helpful tool for the researcher to organize his/her thoughts about the results.
- borrowing the narrative form of those from whom one is learning. This is especially important when dealing with marginalized populations; writing in an emic voice, using the participants' words, brings life to the results that the researcher's etic voice cannot accomplish.
- developing a metaphor. Presenting the data in various ways verbally is sometimes helpful.
- describing functions or organization structure of a group. This is similar to describing the social processes, in that, both social processes and organizational structure and function involve how people interact and relate to each other. Understanding those relationships facilitates one's understanding of the data.
- writing up the critical events in chronological order. This is an effective tool to help the researcher lay out the story from beginning to end.
- making a list of the most important facts. Like the chronology, such a list would help present the story's most important points.
- drawing a visual display of data. There are a variety of ways to display data, including charts, graphs, tables, figures, snapshots, vignettes, video, interactive plays, poems, and concept maps, for example.

LeCompte and Schensul (1999) further the analysis process with these strategies for interpreting the data: engaging in speculation, reviewing the research questions, reviewing relevant theories, contrasting the views of insiders with those of outsiders, seeing relevance to program/policy, evaluating the project, and considering the audience.

Wolcott (1994) describes analysis as relying on "agreed-upon knowledge, the recognition of mutually recognized properties or standards" which are "inherently conservative, careful, systematic" (p. 25). He presents the question of what should be analyzed or what to analyze for. He advocates the following ideas for doing initial analysis:

- Highlight the findings by emphasizing some data more than other data, summarizing what is important to the study.
- Display the findings in graphic representations, including visual displays like concept maps, photographs, videotapes, posters, or computerized drawings.
- Use and report "systematic" fieldwork procedures, such as those presented by Spradley (1972/1988).
- Flesh out whatever analytical framework guided the data collection, such as discourse analysis or content analysis.

- Identify patterns in the data, looking for relationships among the data, “what goes with what” (p. 33), carefully reporting what has been learned without use of generalizations.
- Compare with another case that is known.
- Evaluate by comparing with a recognized standard or include how those included in the research evaluate what is happening.
- Position the results in a broader analytical framework, drawing connections and relating them to theory.
- Critique the research process to determine how one knows what he/she knows; that is, with how much assurance can one say what he/she is saying?'
- Propose a redesign for the study, using what has been learned from the problems encountered in the study (Wolcott, 1994, 29-36).

Wolcott provides several suggestions for interpretation, including:

- Extending the analysis by asking questions derived from one's investigation of the data.
- Making inferences using inductive reasoning.
- Stopping when one comes to the end, noting what needs to be done next.
- Taking the suggestions of one's committee members, colleagues, or editors in whose journals one intends to publish.
- Looking at theory for both analysis and interpretation; the analytical analysis provides structure, while the interpretation provides a way to link to theory for explanatory purposes; one should particularly relate his/her results to competing theories and resolve the conflict in the discussion.
- Refocusing the interpretation on the basis of the tradition in which one is working.
- Connecting with one's own experience, sharing what one “makes of it all” (p. 44).
- Analyzing the interpretive process, explaining what one did and what prohibited his/her further progress.
- Interpreting the analytical process, using counterintuitive ideas, looking for new ways to express one's results and thoughts.
- Exploring alternative formats, including poetry, fiction, performance, and so forth. (Wolcott, 1994, 40-46).

Miles and Huberman (1994) also provide a variety of ways to ensure that the researcher is drawing and verifying conclusions correctly. They suggest that researchers use a variety of the following tactics for generating meaning from the data: Noting patterns and themes; seeing plausibility; clustering; making metaphors; counting; making contrasts/comparisons; partitioning variables; subsuming particulars into the general; factoring; noting relations between variables; finding intervening variables; building a logical chain of evidence; and making conceptual/theoretical coherence. They also suggest the following tactics for testing or confirming findings: Checking for representativeness; checking for researcher effects; triangulating; weighting the evidence; checking the meaning of outliers; using extreme cases; following up

surprises; looking for negative evidence; making if-then tests; ruling out spurious relations; replicating a finding; checking out rival explanations; and getting feedback from informants.

Numbers are typically associated with quantitative means of data collection; however, numbers can also be useful in analyzing qualitative data. The use of numbers or counting can be used to provide frequency counts to generate meaning or show the complexity of a theme. Counting is advocated by Beck (2003) as a tool for identifying patterns in data. Beck also suggests that numbers may be used to document, verify, and test one's interpretations or conclusions. In teaching nursing students to analyze data from written descriptions of patient advocacy, she listed six steps for data analysis, which include: Reading students' written descriptions; extracting significant statements or phrases that are directly related to the phenomenon under study; developing meaning from these statements; organizing the meanings into clusters of themes; using the data analysis results to write an exhaustive description; and using member checks to validate the description written. Member checking, as described by Lincoln and Guba (1985), involves testing the analytic categories, themes, interpretations, and conclusions with the participants of the study to establish credibility. This involves telling their stories in a way that enables them to recognize themselves in the writing, while telling the bigger story that encompasses the stories of all of the participants into a whole.

Jones (2002) highlights the importance of situating the researcher in the research. She notes that positionality is an integral aspect that needs to include the influence that the researcher's presence or position has on who and what can be known. Jones shares Janesick's (2000) belief that observations and interviews are not sufficient for research to be qualitative; the researcher also must "interpret the beliefs and behaviors of the participants" (p. 387). Further, she suggests that identifying themes is not sufficient for analysis. She advocates deriving meaning from engaging in an inductive analytic process that includes an understanding of the exact words and behaviors of the participants, using a number of analytic strategies. The appropriate strategies for analysis, she suggests, are those that produce findings that assist the researcher in developing a deep understanding of the phenomenon under study, with the story emerging from the words and behaviors of the participants and from the contexts in which they occur. These findings should then be combined with the insights, intuitive ideas, creativity and artistry of the researcher (Jones, 2002).

Doucet and Mauthner (1998) use a voice centered relationship model to analyze interview data, which includes several readings of the interview text. To begin, they read through the interview, looking for plot and story, identifying recurring patterns, words, phrases, and contradictions in the text. They then advocate relating the participant's story to that of the researcher's own experience, including the relationship between the researcher and the participant. This involves looking at one's assumptions and at perspectives that may affect one's interpretation. This is the locating of self in the story as related to the participant. Their second reading of the interview focuses on how the participant speaks about herself and her world. They then write up each participant's story in case study form. Doucet and Mauthner (1998) noted,

This approach is fundamentally different to the thematic organization characteristic of most methods of data analysis, including those assisted by computer programs. It delays the reductionist stage of data analysis when transcripts are cut up into themes and aggregated. This process shifts data analysis away from traditional coding, which implies fitting a person into a pre-existing set of categories, whether those of the researcher or those of established theoretical frameworks.

Doucet and Mauthner (1998) use this method to describe individual participants' voices, thereby helping them to maintain differences between the participants. They then move away from individual focus to looking at the data as a whole, breaking each transcript into overlapping themes and sub-themes. The analysis of the data therefore involved organizing the data in different ways (tapes; verbatim transcripts; 4 readings; case studies; summaries; themes) in order to tap into different dimensions of the data sets. It also involved a dialectical process of moving between different ways of organizing or representing the data, and between the details and particularity of each one of the individual respondent's experiences, and the overall picture of the samples as wholes.

A qualitative content analysis approach to data analysis involves reading and re-reading transcripts, looking for similarities and differences that enable the researcher to develop themes and categories. Ways to mark the text include coding paragraphs or other units of analysis; highlighting units of analysis with different colored ink, arranging the data into themes; cutting up transcripts and putting them in thematic folders; using a card index system, noting line numbers for easier cross-referencing; and using computer software to assist in data management activities, like sorting.

Pope, Ziebland, and Mays (2000) also provided strategies for analyzing data, using the framework approach, which includes becoming familiar with the raw data by immersing oneself in it; developing a thematic framework in which one has identified all the key issues, concepts, and themes; indexing all of the data in textual form by coding transcripts or short text descriptors; charting the data using summaries of experiences; mapping and interpretation of data using charts to define concepts, and mapping the range and nature of the phenomena, creating typologies and finding association between themes to find explanations and develop findings.

Miles and Huberman (1994) presented a series of sequential steps for conducting data analysis. These steps include developing codes and applying them to textual data, like field notes from observations, interviews, or documents/artifacts. Then they suggest noting the researcher's reflections on the observations and interviews. Patterns, themes, relationships between themes are then identified. The next step is conducting an investigation of common and different aspects and developing interpretations of findings, followed by verifying the interpretations through member checks, peer review, and triangulation. Additional means of data analysis suggested by Miles and Huberman (1994) include triangulating, using at least three different pieces of data from three different points of view. Triangulation may be viewed in terms of using a variety of both data collection methods and sources. They also suggest constantly comparing earlier data with later data as they are collected, using different bases for comparison, and categorizing and sorting data, using visual displays to enable the researcher to look at the ways that data

develop into categories. One might also look at how the codes develop categories. Miles and Huberman further advocate ordering data and reordering them in various ways, such as by chronology, importance, or frequency, for example. Contrasting data to determine what fits the researcher's assumptions or others' findings is another suggestion for analyzing data they share, along with developing one's own hunches based on his/her instincts about what is happening. Another means they suggest for analyzing data is restating the question to fit the data one has collected. Equally important is providing a visual representation of the data, looking for metaphors that are envisioned as the researcher looks at the diagrams, sketches, charts, and so forth. Other data analysis techniques suggested by Miles and Huberman include summarizing and distilling the data into smaller segments that capture the flavor and meaning of each piece of data; using peer review to discuss one's findings with others, as having to condense the findings into a few words or sentences will help researchers to distill what they have learned from the data; member checking, which may be used to verify information collected, but it also provides a powerful tool for checking out one's interpretations of the participants' stories; stepping away from the data, then returning to it refreshed and with a different perspective on what one is seeing; reiterating one's theoretical lens used to view the data – that is, how does the theory frame the findings (Miles & Huberman, 1994)?

Reporting Findings

In reporting data findings, one does not analyze the data on a question by question basis. Instead, one summarizes key themes, using selected quotes to illustrate findings. Merriam (1998) notes that findings may be presented in different levels of analysis, such as organized, descriptive accounts, themes found repeatedly throughout the data, or as models or theories that explain the data. Merriam (1998) discussed several levels of data analysis. At the basic level, a narrative may be used to present data that have been organized chronologically or topically. The next higher level of analysis involves using concepts developed from the themes and categories to describe phenomena. The third level of analysis Merriam mentioned involves "making inferences, developing models, or generating theory" (p. 187). It is at this phase of analysis that the moving back and forth between the details and a landscape view of concepts occurs, as described by Miles and Huberman (1994). One should present a summary of the findings, using the literature and member checks to substantiate or negate one's findings.

Analysis in Action

Because there are so many techniques described in this article, I sought a means for organizing them to make it easier for readers to identify techniques that they might find useful in their research. Applying the procedures suggested by the authors mentioned in this article, I read and reread their suggested techniques and grouped them into categories. The categories that emerged for me – other researchers may view them differently – included five categories or stages of analysis, extending those described earlier in this paper by Merriam (1998). They include:

1. Narrative – These techniques include suggested actions that are preparatory to the coding process or which help the researcher to derive meaning through narrative approaches, such as narrative reading or writing of textual data.

2. Coding – These techniques apply to those actions that involve organizing and reorganizing the data into categories that enable the researcher to identify relationships between and among categories.
3. Interpretation – These techniques are those actions that enable the researcher to make meaning from the narrative and coding activities and facilitate the researcher's understanding of the conceptual framework generated through the coding process.
4. Confirmation – These techniques enable researchers to be confident that the interpretations they have derived are from the data and not from researcher construction.
5. Presentation – These techniques are those actions that researchers may use to present the findings to a particular audience in a cogent manner and which serve as a tool for further analysis and explanation.

In Table 2, the techniques discussed in this article by LeCompte and Schensul (1999), Wolcott (1994), Beck (2001), Doucet and Mauthner (1998), and Miles and Huberman (1994) are presented as I viewed their fit into these categorical stages.

Table 2

Summary Table of Techniques Used at Various Stages of Analysis

STAGE	LeCompte & Schensul (1999)	Wolcott (1994)	Beck (2003)	Doucet & Mauthner (1998)	Miles & Huberman (1994)
Narrative	<p>Review research questions</p> <p>Write some history</p> <p>Describe a social process</p> <p>Create summaries of interviews</p> <p>Create collections of quotations</p> <p>Describe functions/structures of group</p> <p>Write up critical events chronologically</p> <p>Make list of important facts</p>	<p>Connect to your own experience</p>	<p>Read written descriptions</p>	<p>Relate participant's story to your own experience</p> <p>Locate self in the story as related to participant(s)</p> <p>Look at how participants speak about self and their world</p>	<p>Making metaphors</p> <p>Note reflections on collected data</p>
Coding	<p>Create vignettes</p> <p>Create a conceptual framework</p>	<p>Identify data patterns</p> <p>Extend analysis by asking questions derived from the data</p>	<p>Develop meaning from the statements</p> <p>Organize meanings into clusters of themes</p>	<p>Break down text transcripts into overlapping themes and sub-themes</p> <p>Organize data in different ways</p>	<p>Note patterns and themes</p> <p>Cluster</p> <p>Partition variables</p>

Interpretation	<p>Develop a metaphor</p> <p>Look at theoretical framework; review relevant theories</p> <p>Engage in speculation</p> <p>Look for relevance to program/policy</p>	<p>Relate to theory</p> <p>Refocus on the basis of your tradition/discipline</p> <p>Evaluate against a standard or against participants' interpretation</p>	<p>Extract significant statements related to the phenomenon under study</p>	<p>Shift focus from individual cases to groups</p>	<p>Subsume particulars into the general</p> <p>Factor</p> <p>Note relations between variables</p> <p>Find intervening variables</p> <p>Follow up surprises</p> <p>Develop codes and apply to textual data</p> <p>Identify patterns, themes, relationships between themes.</p> <p>Conduct an investigation of common/different aspects</p> <p>Categorize and sort data</p> <p>Order and reorder data by chronology, importance, frequency</p> <p>Look for plausibility</p> <p>Build a logical chain of evidence</p> <p>Make conceptual/theoretical coherence</p> <p>Weight evidence</p>
to tap into different dimensions of data sets					

	Evaluate the project	<p>Position results in a broader analytic framework</p> <p>Make inferences using inductive reasoning</p> <p>Flesh out analytical framework</p>			<p>Check meaning of outliers</p> <p>Use extreme cases</p> <p>Make if-then tests</p> <p>Rule out spurious relations</p> <p>Develop interpretation of findings</p> <p>Contrast data to determine what fits your assumptions or others' findings</p> <p>Develop hunches</p>
Confirmation	<p>Contrast insider views with outsider views</p>	<p>Critique the research process</p> <p>Report systematic fieldwork procedures</p> <p>Propose a redesign of the study</p> <p>Stop when you come to the end, asking what needs to be done next?</p> <p>Compare to a known case</p> <p>Analyze the interpretive process</p>	<p>Use member checks to validate the written description</p> <p>Use numbers to document, verify, and test interpretations</p>	<p>Look at one's assumptions</p>	<p>Restate question to fit data</p> <p>Triangulate</p> <p>Count</p> <p>Make contrasts and comparisons</p> <p>Check for representativeness</p> <p>Check for researcher effects</p> <p>Look for negative evidence</p> <p>Replicate a finding</p> <p>Check out rival explanations</p> <p>Get feedback from participants</p>

Presenta- tion	<p>Consider the audience</p> <p>Draw visual display</p> <p>Write in narrative form, borrowing form from participants</p>	<p>Emphasize important data</p> <p>Take suggestions from editors/ committee/ colleagues</p> <p>Display findings graphically</p> <p>Explore alternative formats for presentation</p>	Use data analysis results to write an exhaustive description	Write up results in case study form	<p>Verify interpretations by member checks, peer review, triangulation</p> <p>Constantly compare earlier data with later data using different bases for comparison</p> <p>Use visual displays</p>
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Challenges Faced in Qualitative Data Analysis

Beck (2003) noted common pitfalls that beginning researchers make in analyzing qualitative data. These pitfalls include data shuffling, premature closure, and overly delayed closure. She explained that sometimes it is easier for novices to sort data than to move through the process of analysis and interpretation. Typical pitfalls she noted were related to closure, such as when the researcher stops collecting data before all categories are saturated or before enough data are collected or "a solid conceptual outcome is created." She noted that analysis of qualitative data is complex and requires that data be organized and reorganized, presented and represented. Lincoln and Guba (1985) pointed out that knowing when to quit collecting data and concentrate on simply analyzing collected data is determined by the researcher's having exhausted sources, saturation of categories, emergence of regularities in the data, and over-extension.

Teaching Qualitative Data Analysis

There are numerous ways to teach qualitative data analysis. One of the ways data analysis can be taught to students is to have them participate in a group research project in which they each collect data addressing the same research questions, then have them code and analyze the data individually and in groups. In the past, I have used an approach to teaching data analysis, beginning with the discussion of interviewing and observation skills. When teaching interviewing, for example, I have the students develop an interview guide that they use individually to collect data. They are given a couple of weeks to complete the interview, transcribe it, and initially code it. They bring their coded transcripts to class, where they work in small groups to develop a coding scheme that addresses each group member's interview, but which also is representative of the small group's collective data. Each small group then shares its coding scheme, after which they develop an overriding coding scheme that addresses all interviews conducted by class members. Through this process the analysis is taking place using the techniques addressed in the previous section of this paper. The small groups then write up their analysis of the data and present it visually to the class.

Another way used by professors to teach data analysis involves putting a basket of candies of various types on a centrally located table. Student grab a handful of candy and sorts/code it in various ways, then write a small summary of what they found. This has been conducted with buttons, having students sort buttons of various types, colors, materials, and so forth.

One of the most fun ways my students have learned about the coding and analysis aspects of qualitative research involves what I call the "Fantasy Exercise." In this activity, students write on a Post-it note their personal answers to several questions and tape them to the board or wall. After reiterating that this is a fantasy, I ask them to answer the following questions, with their answers to each question put on a separate Post-It note, omitting their identifying information. The questions are: Given all of the money you need, where in the world would you like to go for a month-long vacation? With whom would you like to go on this vacation (it cannot be a spouse, partner, family member, or friend; it must be someone living)?

What would you like to do on this vacation with this person? The answers have provided some hilarity in this activity, and such levity eases their nervousness about their ability to do data analysis. They then look at various ways that the notes can be arranged and rearranged to make sense of the data, and they build a visual display of the analysis to illustrate their findings.

Summary

The process of analyzing qualitative data varies from one study to another, depending on how the researcher is guided by the research questions, the theoretical framework of the study, and the appropriateness of the techniques for making sense of the data. The purpose of analysis is to interpret and, hence, convert the data into a story that describes the phenomenon or the participants' views, using the emic perspective. The process typically involves collecting data that will inform the study, breaking down the data into various categories and making connections between these categories in terms of relationships among them, then visually displaying the interpretation and writing it up for dissemination. While the discussion of data analysis techniques provided in this article is by no means complete, it may provide novice researchers with some ideas for activities that will help them to begin analyzing data. Further, it is my hope that veteran researchers will find such a review of techniques useful for both conducting and teaching data analysis.

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