A General Inductive Approach for Analyzing Qualitative Evaluation Data

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Abstract: A general inductive approach for analysis of qualitative evaluation data is described. The purposes for using an inductive approach are to (a) condense raw textual data into a brief, summary format; (b) establish clear links between the evaluation or research objectives and the summary findings derived from the raw data; and (c) develop a framework of the underlying structure of experiences or processes that are evident in the raw data. The general inductive approach provides an easily used and systematic set of procedures for analyzing qualitative data that can produce reliable and valid findings. Although the general inductive approach is not as strong as some other analytic strategies for theory or model development, it does provide a simple, straightforward approach for deriving findings in the context of focused evaluation questions. Many evaluators are likely to find using a general inductive approach less complicated than using other approaches to qualitative data analysis.

Keywords: inductive analyses; qualitative analysis methods

The collection of qualitative data in evaluation is common. However, knowledge about strategies for efficient and defendable procedures for analyzing qualitative data is less common. A wide range of literature documents the underlying assumptions and procedures associated with analyzing qualitative data, including evaluation data (e.g., Patton, 2002). Many of these are associated with specific approaches or traditions, such as grounded theory (Strauss & Corbin, 1998), phenomenology (e.g., van Manen, 1990), discourse analysis (e.g., Potter & Wetherell, 1994), and narrative analysis (e.g., Leiblich, 1998). However, some analytic approaches are generic and are not labeled within one of the specific traditions of qualitative
research (e.g., Ezzy, 2002; Pope, Ziebland, & Mays, 2000; Silverman, 2000). In working with researchers who adopt what has been described as a “critical realist” epistemology (Miles & Huberman, 1994), I have found that many researchers and evaluators, who are unfamiliar with any of the traditional approaches to qualitative analysis, wish to have a straightforward set of procedures to follow without having to learn the underlying philosophy and technical language associated with many qualitative analysis approaches. Such researchers often find existing literature on qualitative data analysis difficult to understand and use. This article has evolved from the need to provide evaluators and other researchers analyzing qualitative data with a brief, nontechnical set of data analysis procedures.

Several authors reporting analyses of qualitative data in journal articles describe a strategy that can be labeled as a “general inductive approach.” This strategy is evident in much qualitative data analysis (Bryman & Burgess, 1994; Dey, 1993), often without an explicit label being given to the analysis strategy. The purpose of the present article is to describe the key features evident in the general inductive approach and outline a set of procedures that can be used for the analysis of qualitative data. The inductive approach is a systematic procedure for analyzing qualitative data in which the analysis is likely to be guided by specific evaluation objectives. In this article, inductive analysis refers to approaches that primarily use detailed readings of raw data to derive concepts, themes, or a model through interpretations made from the raw data by an evaluator or researcher. This understanding of inductive analysis is consistent with Strauss and Corbin’s (1998) description: “The researcher begins with an area of study and allows the theory to emerge from the data” (p. 12). Deductive analysis refers to data analyses that set out to test whether data are consistent with prior assumptions, theories, or hypotheses identified or constructed by an investigator. In practice, many evaluation projects use both inductive and deductive analysis.

The primary purpose of the inductive approach is to allow research findings to emerge from the frequent, dominant, or significant themes inherent in raw data, without the restraints imposed by structured methodologies. In deductive analyses, such as those used in experimental and hypothesis testing research, key themes are often obscured, reframed, or left invisible because of the preconceptions in the data collection and data analysis procedures imposed by investigators. Scriven’s (1991, p. 56) description of “goal-free” evaluation is consistent with an inductive approach whereby evaluators wish to describe the actual program effects, not just planned effects. The identification of any significant unplanned or unanticipated effects or side effects arising from program implementation can be seen as an important evaluation task.

The following are some of the purposes underlying the development of the general inductive analysis approach.

1. to condense extensive and varied raw text data into a brief, summary format;
2. to establish clear links between the research objectives and the summary findings derived from the raw data and to ensure that these links are both transparent (able to be demonstrated to others) and defensible (justifiable given the objectives of the research); and
3. to develop a model or theory about the underlying structure of experiences or processes that are evident in the text data.

In looking for published examples of research using specific qualitative methodologies, I have found that a general inductive approach is commonly used in health and social science research and evaluation. The following examples of descriptions, taken from the methods sections of research reports, illustrate data analysis strategies that have used a general inductive approach:
The transcripts were read several times to identify themes and categories. In particular, all the transcripts were read by AJ and a subsample was read by JO. After discussion, a coding frame was developed and the transcripts coded by AJ. If new codes emerged the coding frame was changed and the transcripts were reread according to the new structure. This process was used to develop categories, which were then conceptualised into broad themes after further discussion. (Jain & Ogden, 1999, p. 1597)

Emerging themes (or categories) were developed by studying the transcripts repeatedly and considering possible meanings and how these fitted with developing themes. Diagrams were used to focus on what was emerging and to link patient and doctor themes into major barriers to referral. Transcripts were also read “horizontally,” which involved grouping segments of text by theme. Towards the end of the study no new themes emerged, which suggested that major themes had been identified. (Marshall, 1999, p. 419)

A rigorous and systematic reading and coding of the transcripts allowed major themes to emerge. Segments of interview text were coded enabling an analysis of interview segments on a particular theme, the documentation of relationships between themes and the identification of themes important to participants. Similarities and differences across sub-groups (e.g. service providers vs individuals, recent vs long-term migrants) were also explored. (Elliott & Gillie, 1998, p. 331)

The use of an inductive approach is common in several types of qualitative data analyses, especially grounded theory (Strauss & Corbin, 1998). It is consistent with the general patterns of qualitative data analysis described by other authors (e.g., Miles & Huberman, 1994, p. 9; Pope et al., 2000, Punch, 1998). Three broad tasks for qualitative data analysis were described by Miles and Huberman (1994, pp. 10-11): data reduction, data display, and conclusion drawing or verification. Although the general inductive approach is consistent with Miles and Huberman’s analytic framework, it differs in providing a more detailed set of procedures for analyzing and reporting qualitative data (data reduction and display) than is provided in their description. The inductive approach described in this article is intended to clarify the data reduction process by describing a set of procedures for creating meaning in complex data through the development of summary themes or categories from the raw data. These procedures are evident in several descriptive qualitative data analyses. Some have described their approaches explicitly as “inductive” (e.g., Backett & Davison, 1995; Stolee, Zaza, Pedlar, & Myers, 1999), whereas others have used the approach without giving it an explicit label (e.g., Jain & Ogden, 1999; Marshall, 1999). Punch (1998, p. 201) noted that “analytic induction” is a commonly used approach in qualitative analysis. The general inductive approach has some similarity with the “pattern coding” described by Miles and Huberman (pp. 69-71), but the outcomes of inductive coding differ from pattern coding in that the general inductive approach may not involve causes or explanations and relationships among people that are commonly part of pattern coding (p. 70).

**Analytic Strategies**

Some of the analytic strategies or principles underlying the use of a general inductive approach are described below.

1. Data analysis is guided by the evaluation objectives, which identify domains and topics to be investigated. The analysis is carried out through multiple readings and interpretations of the raw data, the inductive component. Although the findings are influenced by the evaluation objectives or questions outlined by the researcher, the findings arise directly from the analysis of the raw data, not from a priori expectations or models. The evaluation objectives provide a focus or domain of relevance for conducting the analysis, not a set of expectations about specific findings.
2. The primary mode of analysis is the development of categories from the raw data into a model or framework. This model contains key themes and processes identified and constructed by the evaluator during the coding process.

3. The findings result from multiple interpretations made from the raw data by the evaluators who code the data. Inevitably, the findings are shaped by the assumptions and experiences of the evaluators conducting the study and carrying out the data analyses. For the findings to be usable, the evaluator must make decisions about what is more important and less important in the data.

4. Different evaluators may produce findings that are not identical and that have nonoverlapping components.

5. The trustworthiness of findings derived from inductive analysis can be assessed using similar techniques to those that are used with other types of qualitative analysis (e.g., Lincoln & Guba, 1985).

It is worth noting that evaluation projects often have specific objectives that guide data collection and analysis. Some common objectives are to identify what is working well in a program and what needs improving. In outcome evaluations, there may be particular interest in collecting qualitative data to identify any unplanned outcomes. Although specific objectives or evaluation questions undoubtedly constrain the range of possible interpretations and outcomes from an inductive analysis by focusing attention on specific aspects of the data, the approach is unlike deductive investigations in which a specific hypothesis, theory, or model is being tested.

Features of Categories Developed From Coding

The outcome of an inductive analysis is the development of categories into a model or framework that summarizes the raw data and conveys key themes and processes. The categories resulting from the coding, which are the core of inductive analysis, potentially have five key features:

1. Category label: a word or short phrase used to refer to the category. The label often carries inherent meanings that may or may not reflect the specific features of the category.

2. Category description: a description of the meaning of the category, including key characteristics, scope, and limitations.

3. Text or data associated with the category: examples of text coded into the category that illustrate meanings, associations, and perspectives associated with the category.

4. Links: Each category may have links or relationships with other categories. In a hierarchical category system (e.g., a tree diagram), these links may indicate superordinate, parallel, and subordinate categories (e.g., “parent, sibling” or “child” relationships). Links are likely to be based on commonalities in meanings between categories or assumed causal relationships.

5. The type of model in which the category is embedded: The category system may be subsequently incorporated in a model, theory, or framework. Such frameworks include an open network (no hierarchy or sequence), a temporal sequence (e.g., movement over time), and a causal network (one category causes changes in another). To be consistent with the inductive process, such models or frameworks represent an end point of the inductive analysis. They are not set up prior to the analysis. It is also possible that a category may not be embedded in any model or framework.

Comparison With Other Data Analysis Approaches

The general inductive approach can be located in relation to other qualitative analysis strategies. Taking three other commonly used strategies, grounded theory, discourse analysis, and phenomenology, Table 1 provides a summary comparison of the four strategies. The general inductive approach is most similar to grounded theory but does not explicitly separate the cod-
ing process into open coding and axial coding. As well, researchers using the general inductive approach typically limit their theory building to the presentation and description of the most important categories. Discourse analysis typically provides a detailed account of the perspectives and rhetorical devices evident in a set of text. Phenomenology seeks to understand the lived experiences among people who have had a common experience (e.g., living with cancer) and to write a coherent account of the meaning of those experiences. Creswell (1998) provided a more detailed comparison of five qualitative research traditions.

**The Process of Inductive Coding**

Inductive coding begins with close readings of text and consideration of the multiple meanings that are inherent in the text. The evaluator then identifies text segments that contain meaningful units and creates a label for a new category to which the text segment is assigned. Additional text segments are added to the categories to which they are relevant. At some stage, the evaluator may develop an initial description of the meaning of a category and write a memo about the category (e.g., associations, links, and implications). The category may also be linked to other categories in various relationships, such as a network, a hierarchy of categories, or a causal sequence.

The following procedures are used for the inductive analysis of qualitative data:

1. **Preparation of raw data files (data cleaning):** Format the raw data files in a common format (e.g., font size, margins, questions or interviewer comments highlighted) if required. Print and/or make a backup of each raw data file (e.g., each interview).
2. **Close reading of text:** Once text has been prepared, the raw text is read in detail until the evaluator is familiar with its content and gains an understanding of the themes and events covered in the text.
3. **Creation of categories:** The evaluator identifies and defines categories or themes. The upper-level or more general categories are likely to be derived from the evaluation aims. The lower-level or specific categories will be derived from multiple readings of the raw data, sometimes referred to as in vivo coding. In inductive coding, categories are commonly created from actual phrases or meanings in specific text segments. Several procedures for creating categories may be used. When using a word processor, marked text segments can be copied into the emerging categories. Specialist

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<th>Grounded Theory</th>
<th>Discourse Analysis</th>
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</tr>
</thead>
<tbody>
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<td>What are the core meanings evident in the text, relevant to evaluation or research objectives?</td>
<td>To generate or discover theory using open and axial coding and theoretical sampling</td>
<td>Concerned with talk and texts as social practices and their rhetorical or argumentative organization</td>
<td>Seeks to uncover the meaning that lives within experience and to convey felt understanding in words</td>
</tr>
<tr>
<td><strong>Outcome of analysis</strong></td>
<td>Themes or categories most relevant to research objectives identified</td>
<td>A theory that includes themes or categories</td>
<td>Multiple meanings of language and text identified and described</td>
<td>A description of lived experiences</td>
</tr>
<tr>
<td><strong>Presentation of findings</strong></td>
<td>Description of most important themes</td>
<td>Description of theory that includes core themes</td>
<td>Descriptive account of multiple meanings in text</td>
<td>A coherent story or narrative about the experience</td>
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**Table 1**

**Comparison of Qualitative Analysis Approaches**

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qualitative analysis software can be used to speed up the coding process when there are large amounts of text data (cf. Durkin, 1997).

4. Overlapping coding and uncoded text: Among the commonly assumed rules that underlie qualitative coding, two are different from the rules typically used in quantitative coding: (a) one segment of text may be coded into more than one category, and (b) a considerable amount of the text (e.g., 50% or more) may not be assigned to any category, because much of the text may not be relevant to the evaluation objectives.

5. Continuing revision and refinement of category system: Within each category, search for sub-topics, including contradictory points of view and new insights. Select appropriate quotations that convey the core theme or essence of a category. The categories may be combined or linked under a superordinate category when the meanings are similar.

An overview of the inductive coding process is shown in Table 2. The intended outcome of the process is to create a small number of summary categories (e.g., between three and eight categories) that in the evaluator’s view capture the key aspects of the themes identified in the raw data and are assessed to be the most important themes given the evaluation objectives. Inductive coding that finishes up with many major themes (e.g., more than eight) can be viewed as incomplete. In this case, some of the categories may need combining, or the evaluator must make hard decisions about which themes or categories are most important.

**Example of the General Inductive Approach**

In a qualitative evaluation of consumers’ reports on their experiences with primary health care services in New Zealand, researchers collected consumers’ accounts of their experiences using face-to-face, telephone, and focus group interviews (Kerse et al., 2004). A primary objective of the evaluation was to identify attributes of health care and encounters with health care providers that are considered important by consumers. Part of the interview schedule included the following items and questions:

- **Tell me about a visit to your family doctor or other health service that went well for you.**
- **What made it go so well?**
- **Tell me about a visit that didn’t go well.**
- **How could it have been improved?**

The general inductive approach was used to analyze the qualitative data to identify themes in the text data that were related to the evaluation objectives. Once the data files were cleaned and put into a common format, the analysis commenced with a close reading of the text, which was carried out by two members of the evaluation team. During the analysis, specific themes were

| Initial reading of | Identify specific text | Label the segments | Reduce overlap and | Create a model |
| text data | segments related | of text to create | redundancy among | incorporating |
| Many pages of text | to objectives | categories | the categories | most important |
| Many segments of | 30 to 40 categories | 15 to 20 categories | 3 to 8 categories |

Source: Adapted from Creswell (2002, p. 266, Figure 9.4) by permission of Pearson Education, Inc. (© 2002, Upper Saddle River, NJ).
developed, which in the view of the investigators captured core messages reported by participants. An early example of a specific theme that emerged was labeled listening skills. Many of the respondents mentioned listening as being important during their encounters with primary health care providers. The following quotations are from text that was coded into this category. Examples of effective and ineffective listening are evident in these quotations:

- “The way the doctor sits there and you explain, he listens to you.”
- “The other doctor I had wouldn’t listen. On one occasion when I was in a lot of pain he told me it was all in my head.”
- “This doctor listens and she is prepared to spend time.”
- “He sorted all these out—I felt listened to, it was good; I felt happy.”
- “Not in a hurry, ready to listen.”

Other specific themes developed from the text included effective communication (e.g., “He is a good communicator and it is nice that he speaks the same language,” “The doctor was using terms that I didn’t understand”), providing clear information (“Ask any question and they answer what you want to know so you feel quite satisfied”), and giving advice on treatment effects (“They’ll explain it and what it’s likely to do and any side effects that could hurt”). These specific themes were then grouped into a broader category labeled communication.

The summary description for the communication category was “Good communication was seen to be essential to successful primary healthcare visits. Good communication by the healthcare provider involved: good listening skills, using language that the consumer can understand, providing clear information and giving advice on treatment effects.”

Four major themes were developed from the specific themes identified and described in the findings relating to consumer experiences. These themes constituted the primary framework for the findings relating to consumer experiences:

- communication (listening, information provided),
- relationship with service provider (equality, respect, approachability),
- availability of service provider, and
- professional expertise.

The model, consisting of the four major categories mentioned above, was used to highlight to stakeholders the main dimensions of quality in primary health care services from consumers’ perspectives.

Assessing Trustworthiness

Lincoln and Guba (1985) described four general types of trustworthiness in qualitative research: credibility, transferability, dependability, and confirmability. Among the procedures they described, those most applicable to performing data analyses include conducting peer debriefings and stakeholder checks as part of establishing credibility and conducting a research audit (comparing the data with the research findings and interpretations) for dependability. Other procedures that can be used for assessing the trustworthiness of the data analysis include consistency checks or checks of interrater reliability (e.g., having another coder take the category descriptions and find the text that belongs in those categories) and member or stakeholder checks (e.g., Erlandson, Harris, Skipper, & Allen, 1993, p. 142). Stakeholder or member checks involve opportunities for people with a specific interest in the evaluation, such as participants, service providers, and funding agencies, to comment on categories or the interpretations made.
Comparisons may be made with previous evaluations on the same topic. Some examples of consistency and stakeholder checks of coding are set out below.

**Coding Consistency Checks**

*Independent parallel coding.* An initial coder carries out an analysis and develops a set of categories that constitute the preliminary findings. A second coder is given the evaluation objectives and some or all of the raw text from which the initial categories were developed. Without seeing the initial categories, the second coder is asked to create a second set of categories from the raw text. This second set of categories is then compared with the first set to establish the extent of overlap. The two sets of categories may subsequently be merged into a combined set. When overlap between the categories is low, further analysis and discussion may be needed to develop a more robust set of categories.

*Check on the clarity of categories.* An initial coding of the raw data is completed. A second coder is given the evaluation objectives, the categories developed, and descriptions of each category, without the raw text attached. The second coder is then given a sample of the raw text (previously coded by the initial coder) and asked to assign sections of the text to the categories that have been developed. A check can then be made of the extent to which the second coder allocated the same text segments to the initial categories as the first coder. A variation of the check on the clarity of the categories is to give a second independent coder both the initial categories and some of the text assigned to these categories. The second coder is then given a new set of text that has not been coded and asked to assign sections of the new text into the initial categories.

*Stakeholder or member checks.* Stakeholder checks enhance the credibility of findings by allowing participants and other people who may have specific interests in the evaluation to comment on or assess the research findings, interpretations, and conclusions. Such checks may be important in establishing the credibility of the findings. For example, participants in the settings studied are given a chance to comment on whether the categories and outcomes described in the findings relate to their personal experiences. Stakeholder checks may be carried out on the initial documents (e.g., interview transcriptions and summaries) and on the data interpretations and findings. Checks by stakeholders may be conducted progressively during a research project both formally and informally. The following list outlines possible stakeholder checks during an evaluation project:

- At the completion of interviewing, data can be summarized and respondents allowed to immediately correct errors of fact or challenge interpretations.
- During subsequent interviews, respondents can be asked to verify interpretations and data gathered in earlier interviews.
- Informal conversations can take place with members of an organization with interests in the setting being studied.
- Copies of a preliminary version, or specific sections, of the evaluation report can be provided to stakeholder groups, and written or oral commentary on the report can be solicited. In some types of evaluations, it may be appropriate for specific stakeholders to approve or signoff the categories and the interpretations made from them.
- Before the submission of the final report, a stakeholder check may be conducted by providing a complete draft copy for review by respondents or other persons in the setting being studied.
Writing the Findings

When reporting findings from inductive analysis, the summary or top-level categories are often used as main headings in the findings, with specific categories as subheadings. It is good practice to include detailed descriptions of categories and suitable quotations from the text to illustrate the meanings of the categories.

Quality of Nursing Care

The following description, taken from Williams and Irurita (1998), illustrates a common reporting style for analyses derived from an inductive approach. “Initiating rapport” was one of four categories developed from nurses’ and patients’ descriptions of the types of nursing care they experienced:

Initiating Rapport

Rapport was established by informal, social communication that enabled the nurse and the patient to get to know each other as persons. One of the nurses interviewed described this interaction:

Just by introducing yourself, by chatting along as you’re doing things... with the patient. Asking them... questions about themselves... like “how are you feeling about being in hospital? How are you feeling about the operation tomorrow?” And then they’ll sort of give you a clue... and actually then tell you how they’re feeling about things... just general chit chat (Nurse). (p. 38)

The sequence used by Williams and Irurita (1998) to describe key information about the category is an effective style for reporting qualitative findings. It consists of

- a label for the category,
- the authors’ description of the meaning of the category, and
- a quotation from the raw text to elaborate the meaning of the category and to show the type of text coded into the category.

This style is recommended for reporting the most important categories that constitute the main findings of an inductive analysis.

Williams and Irurita (1998) also included a figure of the relationships among the four main categories derived from their analysis that linked the categories into an overall model. The categories were (a) initiating rapport, (b) developing trust, (c) identifying patient needs, and (d) delivering quality nursing care. In the model, these categories formed a sequence of steps in which each earlier step had to be completed before the next step could commence (p. 38).

Summary

Evaluators beginning qualitative analyses for the first time often experience a bewildering array of options and strategies for conducting such analyses. The purpose of this article is to provide an elaborated account of a commonly used and straightforward option for analyzing qualitative data. The general inductive approach, described in detail in this article, provides an option for those evaluators who seek a simple, nontechnical means to carry out qualitative analyses. I acknowledge that evaluators who use other analytic traditions, such as discourse analysis
and phenomenology, seek a different set of outcomes from their analyses than those that are likely to emerge from a general inductive analysis. However, in my experience, many evaluators need an analytic approach that is easy to use, does not require in-depth understanding of a specialist approach, and produces findings that defensibly address evaluation objectives and questions. The general inductive approach provides a convenient and efficient way of analyzing qualitative data for these purposes. Although the inductive approach is not as strong as some other approaches in the area of theory or model development, it does provide a simple, straightforward approach for deriving findings linked to focused evaluation questions. For this reason, many evaluators are likely to find using a general inductive approach more useful than other approaches to qualitative data analysis.

References


