Qualitative Research Methods:
A Review of Major Stages, Data Analysis Techniques, and Quality Controls

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This review examines the basic tenets of qualitative or naturalistic methods in terms of their original grounding in the basic social sciences and their value to library and information science research. Examination of the five key points provides the understanding needed to move from contemplation to use of these methods: the research problem, data gathering, content analysis, theory development, and validity techniques.

The past 50 years have seen a strong development of the theories and techniques associated with the naturalistic paradigm and qualitative research methods. Scholars in the field of library and information science (LIS) make increasing use of this approach to address certain research questions. Raya Fidel's excellent "guided tour through the world of such research" (Fidel, 1993, p. 220) provides an invaluable context for scholars considering the use of these methods. Through the following review the basic tenets of those methods will be examined in terms of their original grounding in the basic social sciences and their value to LIS research in particular.

Given the vast scope of this topic, certain parameters must be set. First, this review is expected to be of particular value to those readers who are knowledgeable regarding general research principles but more interested than experienced in the application of qualitative methods. Second, this review is selective rather than exhaustive. Those methods, theories, and authors that most illustrate the perspective of qualitative work for this audience have been covered. Together, these choices for this audience might support the active exploration of this research approach.

In virtually every area of LIS research, from system design to user education evaluation, the concatenation of factors that finally lead a user to an interaction with some part of an information system is increasingly complex. Naturalistic work seeks out all aspects of that complexity on the grounds that they are essential to understanding the behavior of which they are a part. "It is difficult to imagine a human activity that is context-free" (Lincoln & Guba, 1985, p. 114). The flexibility and sensitivity of the human instrument are critical to the effort to understand this complexity.

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THE NATURALISTIC APPROACH

What Is it?

When defined as a research paradigm rather than as a research method, naturalism is an approach that posits reality as holistic and continually changing so that theory formation becomes an ongoing process designed to understand phenomena. As such, the naturalistic approach should provide much needed insights into information seeking experiences. "The changing of social structures means that a prime sociological task is the exploration——sometimes the discovery——of emerging structures" (Glaser & Strauss, 1967, p. 235). Christians and Carey (1989) provided a useful perspective on the purpose of the naturalistic approach.

Primarily developed within living memory, the naturalistic paradigm has gradually gained acceptance in much of academia:

> The professional schools of social work . . . and information studies have always lagged behind the academic disciplines in accepting new theoretical and methodological trends. . . . Because of their marginal position, people in these fields tend to be conservative——the imitators rather than the innovators. (Bogdan, 1990, p. xiii)

Nevertheless, resultant theories (such as Mellon's "library anxiety") and major grant-funded research (such as that of Chatman and Kuhlthau) have opened the doors for new projects in LIS. There "is no question that naturalistic inquiry, involving techniques well established in such fields as cultural anthropology, has its place in librarianship" (Davis, 1990, p. 327).

When Is it Most Useful?

The research problem must determine the research approach and the methods employed. No single approach fits every problem; a choice must be made. Some areas of LIS research are so new, so complex, or so unexplored that scholars are looking for additional or different approaches.

If enough is known of an area to sustain a priori patterning, hypothesis formation, or even theory explication, then the positivist approach with its more quantitative methods might be used. If so little is known of an area that the simple identification of what is not known becomes problematic then the naturalistic approach with its more qualitative methods might be used. Although less commonly utilized in LIS research, the naturalistic paradigm with its qualitative methods and content analysis techniques has much to offer. Of course, in many research situations some combination of the positivist and naturalist approaches provides the most complete or insightful understanding. Using the former for segments of a research problem that support hypothesis testing and the latter for areas that are yet to be so well understood, for example, can maximize the benefits gained in large-scale research study. Given the rapidly changing environment of LIS work, it is of critical importance that this positivist/naturalist choice be made in terms of what best answers the research problem.

GATHERING DATA

Observation

Understanding observation requires a focus on two points. First, as Raymond Gold (1969) discussed, there are four different positions on a continuum of roles that field researchers play when using the observation technique: complete participant, participant-as-observer, observer-as-participant, and complete observer (Babbie, 1989, also discussed in Chatman, 1992, and Schwartz & Schwartz, 1955). This variety allows use of whatever perspective will best answer the research question. Another major advantage "is that it provides here-and-now experience in depth" (Lincoln & Guba, 1985, p. 273). Second, as Whyte (1979) noted, it is really a "set of methods including interviewing, since any able field worker will supplement what is learned from observing and participating with some interviewing" (p. 56). Chatman (1991), for example, used the combination of "participant observation and an interview guide consisting of 28 items" (p. 442) in her 2-year study of the information needs of janitorial workers. LeCompte, Preissle, and Tesch (1993) described it as "a method relying on watching, listening, asking questions, and collecting things" (p. 196). Jorgensen (1989) concurred, noting in addition that it is critical for researchers to "remain open to the unexpected" (p. 82). The observer must choose a point of balance between observing and participating then supplement it with judicious interviewing. "Participant observation in its various forms is not new to library or information research" (Fidel, 1984, p. 275). For one of the earliest discussions of this method in LIS research, see Bruyn's study (1970), originally published in 1963.

The obvious advantage of this method has been noted by LeCompte et al. (1993):

> One problem researchers encounter is that participant reports of activities and beliefs may not match their observed behavior. Participant observation is a check, enabling the researcher to verify that individuals are doing what they (and the researcher) believe they are doing. (p. 197)

Denzin (1989) rated it as "excellent" in its ability to counter the ill effects of time order, history, and maturation.

Although only unobtrusive observation in the natural setting, with all its attendant ethical and logistical difficulties, can negate the impact of the observer on the observed, much can be accomplished through properly conducted general observation. Wilson and Streatfield (1981) provided an example of a highly structured observation technique in an organizational setting. "The intent is to fit into the setting in such a way that the usual behavior of the people being studied is changed as little as possible. . . . it is important that the role be assumed regularly and consistently" (Mellon, 1990, p. 40). Schwartz and Schwartz (1955) noted that the researcher must attempt to "strike that balance between active participation in the lives of the subjects and observation of their behavior which will be most productive of valid data" (p. 349). Focusing the observational field should "begin with the widest possible range of phenomena, gradually limiting your attention to particular phenomena" (Jorgensen, 1989, p. 84). The observer must "take account of practices, supporting ideologies, and ranges of deviation, and to relate these to each other" (Diesing, 1972, p. 19). As Diesing noted in his chapter on this method, one "learns concepts and distinctions not just by asking people or reading an article but by participating in innumerable activities" (p. 291).

Several basic technical skills encourage the fullest flow of material from the informants; various means of establishing rapport and the restating of informants' observations are just two examples (Jorgensen, 1989). Chatman (1984) provided guidelines to information seeking research, whereas Bogdan and Taylor's (1975) chapter on participant observation provided more detailed guidelines for use of the method in general.

Interviews

In all their variety, interviews are a valuable qualitative method. Researchers must choose their own points along the continuum between structured and unstructured interviews. The

> structured interview is the mode of choice when the interviewer *knows what he or she does not know* and can therefore frame appropriate questions to find it out, while the unstructured interview is the mode of choice when the interviewer *does not know what he or she doesn't know* and must therefore rely on the respondent to tell him or her. (Lincoln & Guba, 1985, p. 269)

Another choice can be made along the continuum between exit interviews (taking place at the end of an event, such as an online search) to in-depth interviews (often taking place over a course of several hours) to focus group interviews (Jorgensen, 1989). Finally, a choice must be made as to the number of people involved in the interview: one, a small group, or a larger group.

There are several strengths in interviewing such as the fact "that it permits the respondent to move back and forth in time . . . " (Glaser & Strauss, 1967, p. 273). The flexibility of the technique allows the investigator to probe, to clarify, and to create new questions based on what has already been heard. Whyte (1979) recommended that the interviewer "let the conversation flow naturally but note what aspects of events the informant describes or leaves out so that later the interviewer can phrase questions to fill in omissions or to check his or her understanding of what has been said" (p. 57). This "flexibly structured" interview style allows the researcher to "recognize statements which suggest new questions or even new lines of investigation" (p. 57).

Although there is obvious benefit to the researcher, the appeal of interviewing to the informants may be less obvious. Whereas actual payment is employed as a motivator in certain projects, informants "generally find it a rewarding experience to be interviewed by a skilled and sympathetic person. . . . [It can be] useful in helping them to gain perspective on and understanding of their ideas and experiences" (Whyte, 1979, p. 60). As Argyris (1958) put it, the informants "must feel that they are contributing to something whose completion will be quite satisfying to them" (p. 39).

As with participant observation, specific skills and techniques have long been used to strengthen the depth of the resultant data. The use of certain questioning techniques is one example: "Comparison questions ask people to tell how things are like one another while contrast questions ask people to tell how things differ from one another" (Jorgensen, 1989, p. 88). Clark and Schober (1992) wrote at length regarding the most productive techniques for framing questions. Croyle and Loftus (1992) delineated mechanisms for improving the episodic memory of informants. Dewdney and Harris (1992) urged the use of probing and clarifying questions. Gorden (1970) discussed

means of recognizing and dealing with issues such as topics that are threatening to the ego of the informant.

ANALYZING DATA

Content Analysis in General

One of the most commonly used data analysis techniques of qualitative research, content analysis can be defined as "a research technique for making replicable and valid inferences from data to their context" (Kaplan, 1964, p. 21). Weber (1990) characterized it as "a research method that uses a set of procedures to make valid inferences from text. These inferences are about the sender(s) of the message, the message itself, or the audience of the message" (p. 9). It is based on the premise that the many words from interviews and observations can be reduced to categories in which words share the same meaning or connotation. The classification procedure that is used to accomplish this reduction must be consistent so that anyone (with training) would get the same results (Weber, 1990). Data analysis involves "working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others" (Bogdan & Biklen, 1982, p. 145).

Two principles of qualitative data analysis are quite consistent in all descriptions of it. First, it is an ongoing process that feeds back into the research design right up until the investigator leaves the field for good. Second, whatever theory or working hypothesis eventually develops must grow naturally from the data analysis rather than standing to the side as an a priori statement that the data will find to be accurate or wanting.

Because the purpose is to understand rather than to predict, qualitative research requires a cyclical approach in which the collection of data affects the analysis of the data which, in turn, affects the gradual formation of theory which, in turn, affects the further collection of data. "Data collection and analysis form an integrated activity" (Mellon, 1990, p. 24).

> On site, the investigator must engage in *continuous* data analysis, so that every new act of investigation takes into account everything that has been learned so far. Inductive data analyses can be performed on a daily basis, so that insights, elements of theory, hypotheses, questions, gaps, can be identified and pursued beginning with the next day's work. (Lincoln & Guba, 1985, p. 209)

The naturalistic data analysis technique of content analysis coding makes intuitive sense to LIS researchers who are familiar with searching for patterns in the information they organize and provide access to. Unfortunately, the use of content analysis in LIS research has been relatively sparse with reports of its use ranging from 2.9% to 4.9% of the research literature (Allen & Reser, 1990). Nevertheless, the

> techniques of content analysis have considerable potential for library and information research. Many of the phenomena which characterize library and information work take the form of discourse. . . . Content analysis can provide an understanding of these materials, if it is used in a rigorous manner. (p. 260)

For an example of a recent application of this method in this field see Snelson and Talar (1991).

Content Analysis Terms

Before exploring the actual techniques of content analysis, it is necessary to review a few of the basic terms. A *datum* "is a unit of information that is recorded in a durable medium, distinguishable from other data, analyzable by explicit techniques, and relevant to a particular problem" (Krippendorff, 1980, p. 53). These units may be any of the following: physical (pages), syntactical (words), referential (objects, events, persons, acts), propositional (words which are required to conform to a certain structure), and thematic (require deep understanding of the source language).

Essential to coding units of data is the term *category* that refers to "groups of words with similar meanings and/or connotations" (Weber, 1990, p. 37). The term *theme* then refers to clusters of categories that share some commonality such as reference to a single issue.

Field notes are a data collection tool that contain everything the investigator saw, experienced, and remembered as well as notes on emotions and analytic comments (Mellon, 1990). These field or observation notes come in various formats including the following: running notes, field experience logs or diaries, and notes on thematic units (Lincoln & Guba, 1985).

Memos are brief, informal essays written by the investigator to capture some part of the content analysis process that has been inductively recognized. "Memoing should begin as soon as the first field data start coming in, and will usually continue right up to the production of final report text. . . . Memoing contributes strongly to the development/revision of the coding system" (Miles & Huberman, 1984, p. 71). It is critical to recognize that "memos are always conceptual in intent. They do not just report data, but they tie different pieces of data together in a cluster, or they show that a particular piece of data is an instance of a general concept" (p. 69).

Constant Comparative Method

The constant comparative method, created by Glaser and Strauss (1967), is generally recognized as the most effective means of content analysis (Lincoln & Guba, 1985; Mellon, 1990). It involves joint coding and analysis during the continual review of data to gradually form categories. "The constant comparative method can be described in four stages: (1) comparing incidents applicable to each category, (2) integrating categories and their properties, (3) delimiting the theory, and (4) writing the theory" (Glaser, 1965, p. 439). These categories are carefully defined and made mutually exclusive so that relationships can be identified between those elements that fall into the categories.

The investigator must go through several cycles until the coding criteria are accurate and consistent (Krippendorff, 1980). "By constant comparison of all current incidents in a category, the researcher begins to develop ideas about the category, its dimensions and limitations, and its relationship to other categories" (Mellon, 1990, pp. 72-73). This cyclical approach to analysis helps ensure that the theory develops out of the data. The

constant comparative method is designed . . . to guarantee that two analysts
working independently with the same data will achieve the same results; it is
designed to allow, with discipline, for some of the vagueness and flexibility
that aid the creative generation of theory. (Glaser & Strauss, 1967, p. 103)

As Glaser explained in 1965, the "purpose of the constant comparative method of joint
coding and analysis is to generate theory . . . systematically . . . by using the explicit
coding and analytic procedures" (p. 437). Like other methods, comparative analysis can
be used to generate both substantive and formal theory, the former referring to specific
areas such as OPAC use and the latter referring to conceptual areas such as
information seeking patterns (Glaser & Strauss, 1967).

Coding Data

Coding lies at the heart of the constant comparative method in that units of data are
compared to each other in terms of their fit in the coding scheme. Coding does not
descriptively paraphrase the notes; instead it identifies the main categories as well as
associated subcategories so that, eventually, all units of data can be categorized
according to these codes (Strauss, 1987). Stempel (1989) pointed out that these
categories must be pertinent and functional. "By comparing where the facts are similar
or different, we can generate properties of categories that increase the categories'
generality and explanatory power" (Glaser & Strauss, 1967, p. 24).

Field notes, in their many formats, serve as the document upon which are written
both initial codes and memos (Glaser & Strauss, 1967). Immediately following an
interview or observation period, the investigator must organize and complete the notes
so that initial analysis can begin (Lincoln & Guba, 1985). Periods of preliminary data
analysis must be interpolated between periods of data gathering. This analysis consists,
in part, of flashing out skeletal field notes and reviewing the results to locate any
preliminary patterns that might begin to emerge (Lincoln & Guba, 1985).

Strauss (1987) listed several advantages of coding data. He noted that

coding (1) both follows upon and leads to generative questions; (2) fractures
the data, thus freeing the researcher from description and forcing
interpretation to higher levels of abstraction; (3) is the pivotal operation for
moving toward the discovery of a core category or categories; and so (4)
moves toward ultimate integration of the entire analysis; and (5) yields the
desired conceptual density (i.e., relationships among the codes and the
development of each). . . . (pp. 55-56)

Three different types of coding generally follow the progression of a content
analysis. Open coding is the initial, provisional work done on an unrestricted basis to
produce concepts that seem to fit the data (Strauss, 1987). Axial coding takes place
during the latter portions of open coding as major categories emerge from the data.
By focusing on one category in terms of its conditions, consequences, and other
features, the researcher develops cumulative knowledge about the category as well as
its subcategories and related categories (Strauss, 1987). Selective coding takes place as
soon as open and axial coding have begun to establish core categories. At this point,

even if the other two methods are still in use, everything gradually becomes subservient to the core categories.

The principle of saturation is critical in data analysis. A category can be considered saturated when no new information about it develops out of the data. Once a category is as fully understood as possible in all of its ramifications and detail then the continuous assignment of new data to that category becomes unnecessary for the generation of theory.

Coding Tips

Only practice and experience can translate the mechanics of coding guidelines into efficient, effective techniques. Nevertheless, certain helpful suggestions can facilitate that process. Strauss (1987) recommended, for example, that during the initial, open coding the researcher look for terms used by the subjects. Once the categories are firmly in mind, the focus moves to understanding each day's observations where recoding the data as necessary becomes critical (Glaser & Strauss, 1967).

After leaving the field but prior to final data analysis, various guidelines are useful. For example, if a memo becomes central to the theory then saturate that redeveloped category or property (Glaser & Strauss, 1967). Memos, from theoretical to methodological, have their own special guidelines. Two of the most common are to "give priority to memoing" (Miles & Huberman, 1984, p. 71) and to indicate in memos when saturation has been reached (Babbie, 1989).

No single mechanism exists for determining the categories into which the data is sorted. In general, "it is presumptuous to assume that one begins to know the relevant categories and hypotheses until the 'first days in the field,' at least, are over" (Glaser & Strauss, 1967, p. 34). Although categories must evolve from the data, several types of categories are quite common in coding. Bogdan and Biklen (1982), for example, noted 10 such category types, whereas Lofland and Lofland (1984) formulated 11 "thinking units" that could be used as coding categories.

Once the categories have formed, certain guidelines assist in their use. Entries can be continuous rather than dichotomous in their intensity, and some units may be used in two categories where one is the main category and the other is a subcategory (Weber, 1990). "Ordinarily, use a single code for a segment. Dual or even multiple coding is warranted if a segment is both descriptively and inferentially meaningful" (Miles & Huberman, 1984, p. 64).

There are six major ways of grouping categories, of which clustering has the most potential for the methods under review in this study. Clustering seeks to group or to lump together categories that share some observed qualities or, alternatively, to partition or to divide them into mutually exclusive classes whose boundaries reflect differences in the observed qualities of their members (Krippendorff, 1980).

Moving From Codes to Theories

The process of moving from coding to theory or pattern generation is ongoing but at some point it is necessary to leave the field and begin the final analysis (Ely, Anzul, Friedman, Garner, & Steinmetz, 1991). After all the data is finally coded, analysis gradually reveals a framework of patterns and contrasts from which, in many cases, theory can be developed. "The truly emergent integrating framework, which

encompasses the fullest possible diversity of categories and properties, becomes an open-ended scheme, hardly subject to being redesigned" (Glaser & Strauss, 1967, p. 41). Reducing terminology and generalizing gains a parsimony of variables as well as scope in the applicability of the theory to a wide range of situations.

Eventually the investigator is ready for what Glaser and Strauss (1967) referred to as "delimiting the theory." This curbs what could become an overwhelming task and occurs at two levels: the theory and the categories. First, the theory solidifies in the sense that major modifications become fewer and fewer as the analyst compares the next incidents of a category to its properties. Second, categories become theoretically saturated. Lincoln and Guba (1985) described a mechanism for delimiting theory that involves sorting data within categories, reviewing categories for overlap, and looking for relationships among categories.

Insuring Coding Integrity

During coding certain techniques should be used to ensure the integrity of the work. When using a human coder, the acceptable reliability level must be established prior to test coding and met regularly before final coding (Weber, 1990). Reproducibility (i.e., intercoder reliability) is a minimum standard. "Double-coding the same transcripts is essential . . . get code-recode consistencies over 90 percent before going on" (Miles & Huberman, 1984, p. 64). "Stability is the degree to which a process is invariant or unchanging over time. Stability becomes manifest under test-retest conditions. . . ." (Krippendorff, 1980, p. 130). Face validity refers to the correspondence between investigators' definitions of concepts and their definitions of the categories that measured them. This is necessary but far from sufficient. A category should appear to measure the construct it is intended to measure (Weber, 1990).

During the analysis of data, certain techniques can strengthen the resultant claims. Sometimes other sources can be used to confirm inferences from data. These may include past successes, contextual experiences, established theories, and representative interpreters. "A content analysis is valid to the extent its inferences are upheld in the face of independently obtained evidence" (Krippendorff, 1980, p. 155). Of course that independent evidence is not always available.

GROUNDED THEORY

Although not the only means of generating a final theoretical analysis of data, the grounded theory approach stands out as central to the naturalistic paradigm. "The grounded theory approach is a method for discovering theories, concepts, hypotheses, and propositions directly from data, rather than from a priori assumptions, other research, or existing theoretical frameworks" (Taylor & Bogdan, 1984, p. 126). When data collection and analysis cease the resultant theory provides a depth of understanding pertinent to the entities studied. This work has "a high emphasis on theory as process; that is, theory as an ever-developing entity, not as a perfected product" (Glaser & Strauss, 1967, p. 32). Generalizability is not a factor because the "aim is understanding the phenomenon rather than controlling it. . . . The intent is to understand the situation as it exists in one particular setting rather than to predict what might happen in similar settings" (Mellon, 1990, p. 5). This inquiry "attempts . . . to understand why people . . . behave as they do" (pp. 2-3).

Although not predictive in nature, the resultant theory does have concrete value (Glaser & Strauss, 1967). Applications are tentative and can only be applied in other settings if multisite studies have been extensive or if a fit is made between two similar settings. Because "in-depth understanding of human actions is the primary focus" (Mellon, 1990, p. 20), results of naturalistic work will vary but will not be the flat statements of what hypothesis has been proved or disproved commonly found in positivist approaches. "In generating grounded theory researchers do not seek to prove their theories, but merely to demonstrate plausible support for them" (Taylor & Bogdan, 1984, p. 126).

A working hypothesis is most likely to be presented as it describes the patterns encountered and their broad relationships to each other. The working hypothesis is best as a general guide in that it has neither the artificiality of the scientist's hypothesis nor the narrowness of the single case study's description but, instead, offers the "broad range of the related" (Lincoln & Guba, 1985, p. 122). However, it must be remembered that "working hypotheses are not that powerful; their transferability depends upon the degree of fittingness" (p. 124). Some of these hypotheses may later be tested in a quantitative approach but many will describe an ongoing process of mutual shaping so complex that verifying any subset thereof is meaningless.

Turner (1981) delineated several advantages of the grounded theory approach. "It promotes the development of theoretical accounts and explanations which conform closely to the situations being observed, so that the theory is likely to be intelligible to, and usable by, those in the situations studied . . ." (pp. 226-227). Grounded theories are likely to reflect the complexity of that which is studied rather than oversimplifying it.

ENSURING INTEGRITY

General Approach

Ensuring integrity is no more difficult for naturalistic work than it is for positivist work but, again, the means differ. As Dewdney (1992) remarked, field studies "need not lack rigor and the field setting in itself does not necessarily imply deficiencies in control if the researcher develops systematic procedures for documenting the observed behavior" (p. 122). Whereas positivists use random samples and so on to support such aspects as generalizability, naturalists use prolonged contact and so on to support such aspects as transferability. Given the necessity of research within whatever setting that is most natural for the subjects, the investigator can not escape bias and so must recognize its impact upon the study (Mellon, 1990) in much the same way that a positivist recognizes the impact of an artificial laboratory setting upon a subject's response. Central to that axiom is the belief that "the human instrument is as capable of refinements as any other variety" (Lincoln & Guba, 1985, p. 194).

The techniques and approaches discussed later focus on ensuring the integrity, trustworthiness, and value of naturalistic data gathering and analysis as well as the theory or working hypothesis that results from them. As with the positivist paradigm, there are no absolute guarantees of results that are both meaningful and unbiased.

Five Techniques

Several scholars have delineated their methods of ensuring integrity but those of Lincoln and Guba (1985) included most of those mentioned elsewhere. They listed five major techniques that help to establish the credibility of naturalistic work.

1. Certain activities increase "the probability that credible findings will be produced" (p. 301). These include prolonged engagement, persistent observation, and triangulation (which includes "different modes of data collection, using any that come logically to hand but depending most on qualitative methods," pp. 306-307). Fortner and Christians (1989) offered further insights.

2. Peer debriefing "is a process of exposing oneself to a disinterested peer in a manner paralleling an analytic session and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer's mind" (Lincoln & Guba, 1985, p. 308). It must be noted that some disagree with the value of critical peer reactions, thinking it better to have supportive peers who give constructive feedback than oppositional peers who play the devil's advocate (Ely et al., 1991).

3. The use of negative case analysis is done to "refine a hypothesis until it accounts for all known cases without exception . . ." (Lincoln & Guba, 1985, p. 309). Although that ideal may not really be possible, "if a hypothesis could be formulated that fit some reasonable number of cases—even as low, say, as 60 percent—there would seem to be substantial evidence of its acceptability. After all, has anyone ever produced a perfect statistical finding, significant at the .000 level" (pp. 312-313)?

4. Although difficult for the resource poor investigator, referential adequacy can be valuable. This technique requires the investigator to "earmark a portion of the data to be archived—not included in whatever data analysis may be planned . . ." (Lincoln & Guba, 1985, p. 313). Once the analysis is completed then this archived data is retrieved and examined in light of the results with an eye to inconsistencies and gaps.

5. "The member check, whereby data, analytic categories, interpretations, and conclusions are tested with members of those stakeholding groups from whom the data were originally collected, is the most crucial technique for establishing credibility" (Lincoln & Guba, 1985, p. 314). It can be both formal and informal. Member checking is particularly vital as meaningful feedback from subjects can rapidly expose gaps or flaws in any data gathering technique, working hypothesis or emerging theory (Ely et al., 1991).

Additional Techniques

"Both implicitly and explicitly, the analyst continually checks out [the] theory as the data pour in" (Glaser & Strauss, 1967, p. 26). Standard techniques, in addition to those listed earlier, are available such as: category saturation, collection of referential

adequacy materials, establishing structural corroboration or coherence, reflexive journals, audits (Guba, 1981; Lincoln & Guba, 1985), self-transcription (Mellon, 1990), explicit recording instructions (Krippendorff, 1980), a personal log, and a methodological log (Lincoln & Guba, 1985).

In addition, Miles and Huberman (1984) listed 12 tactics for "confirming meanings, avoiding bias, and assuring the quality of conclusions" (p. 215), namely: counting, noting patterns or themes, seeing plausibility, clustering, making metaphors, splitting variables, subsuming particulars into the general, factoring, noting relations between variables, finding intervening variables, building a logical chain of evidence, and making conceptual or theoretical coherence.

Elfreda Chatman's (1992) techniques for seeking reliability, which she defined as pertaining "to the degree to which observations are reported as consistent with some phenomenon during the life span of the inquiry" (p. 8), were varied. She would do all of the following: consistently take notes, immerse herself in the setting, expose herself to multiple situations, and build on what she learned for other research studies. She also stated that "*validity* pertains to truth or the degree to which the researcher is given a true picture of the phenomenon being studied" (p. 12). Her research sought to build on all three "components of validity: face, criterion, and construct" (p. 12).

CONCLUSION

The value of much of this type of work lies in the possibility that others may find some aspects of it that transfer to their own settings. It becomes important for the investigator to supply full information regarding anything which might affect that transfer. "It is . . . not the naturalist's task to provide an index of transferability; it is his or her responsibility to provide the data base that makes transferability judgments possible on the part of potential appliers" (Lincoln & Guba, 1985, p. 316).

As LIS scholars lead the information community's development of information systems and services for users, they must maintain a solid grounding in the purpose behind their work. Understanding what users encounter as they move through the complex, multidimensional, and dynamic experience of information seeking provides that solid grounding. Qualitative research methods enrich and augment the toolbox of LIS research approaches.

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