

Qualitative Methods in Information Retrieval Research

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This review of the literature shows that the number of research projects in information retrieval (IR) that employ qualitative methods is on the rise. Although no agreed-upon definition exists for the concept qualitative research, a number of typical characteristics describe its nature. Qualitative research is noncontrolling, holistic and case oriented, about processes, open and flexible, diverse in methods, humanistic, inductive, and scientific. Although these characteristics make qualitative methods the best for exploring human behavior in depth, and thus of great relevance to IR research, only a few studies present all of them. Doctoral students, librarians, and others who are interested in qualitative methods have many sources for gaining support and guidance: methodological writings, textbooks and handbooks, and several departments at academic institutions.

In early December 1992, JESSE was steaming with discussion about the quantity and quality of data. The listserv conference, which focuses on teaching and educational concerns in library and information science (LIS), carried the discussion well into the new year. Taking various approaches, most discussants claimed that it was time to consider qualitative research methods. Although the debate was informal and did not break new ground, having such an intense correspondence on the subject reflects the growing interest in qualitative research among LIS educators.

This interest is relatively new. Although it is steadily on the rise, in 1985 only 1.6% of LIS research employed qualitative methods (Järvelin & Vakkari, 1993). In his foreword to *Naturalistic Inquiry for Library Science* (Mellon, 1990), Robert Bogdan observed:

in the 1980s, naturalistic inquiry began making a significant impact in the professions. Education was the first in courting the approach. Social work,

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human development, and nursing followed. Information studies has perhaps been the least affected (p. xvi).

Today, only 3 years later, we can already see its increasing impact: two books about qualitative research in LIS have been published, numerous doctoral dissertations in library schools are based on qualitative inquiry, sessions in professional conferences address the topic, an upcoming issue of *Library Quarterly* has been dedicated to the subject (Bradley & Sutton, in press), a whole issue of *Swedish Library Research* (Frid, 1990) reports on qualitative user studies, and a growing number of research projects include qualitative components.

What is qualitative research? Among LIS researchers the answers are extremely diverse; different people have different ideas about what constitutes qualitative research. This article is a guided tour through the world of such research. It first examines the definitions of qualitative research and then describes its nature through examples taken from LIS research. After pointing out its contribution, the tour concludes with some practical advice and encouragement to those interested in pursuing qualitative inquiry.

To prepare this tour, I contacted colleagues through listservs on the Internet, asking for copies of research reports or information about them. Many responded and provided most useful information. To treat the topic comprehensively, however, I had to set boundaries. Therefore, this tour is limited to information retrieval (IR) research, which is construed broadly. Not reported, however, are studies in education, educational technology, and organization research, areas with considerable qualitative research. In addition, the tour excludes studies that are purely for evaluation purposes. That is, studies that were made only to solve a concrete and immediate problem or to support concrete and immediate administrative or managerial decisions, but were not aimed at enhancing general understanding, are not covered. To compensate for the limited coverage, the reader may want to consult bibliographies, such as those by DeVinney (1992), and Pitts and Forrest (1992).

WHAT IS QUALITATIVE RESEARCH?

The concept of *qualitative research*, much like that of *information*, has no short, elegant, and universally agreed-upon definition. Yet, qualitative researchers know what it means, and what its attributes are, and this knowledge guides them in every step of their research.

Qualitative research is *essentially* different from quantitative research; the difference between them is not a matter of degree, and in some aspects, the two are opposites. In fact, some authors find it easiest to define qualitative methods by explaining the differences between the two types (e.g., McCall & Simmons, 1969; Mellon, 1990), or by showing what qualitative methods are not, by referring to attributes of quantitative research (e.g., Glazier & Powell, 1992; Strauss & Corbin, 1990).

Although essentially different, each method can use elements of the other. Quantitative research always includes a basic qualitative component: Qualities, not the phenomena or objects themselves, are measured or counted (Ratcliff, 1983). Without first defining what is being measured or counted, one cannot perform quantitative analyses. As Barnett (1983, pp. 12-13) explained,

qualities are those attributes of objects, persons, and events that enable us to identify and classify them. That definition [of qualities] supplies a premise that at once permits the inference that lengths, volumes, and weights are qualities no less than are colors, sounds, and taste. So is being kind, generous, and awkward. It is true that the dimensions and magnitudes of lengths, volumes, and weights can be measured in units and that those units can be treated mathematically, whereas intensities within each of the other categories can only be graded and their degrees compared in terms of equality or inequality.

Robertson and Hancock-Beaulieu (1992) actually demonstrated this idea and showed that retrieval experiments, including Cranfield-like tests, include very important qualitative aspects.

On the other hand, a qualitative study can use quantitative techniques. Diesing (1971) and Gephart (1988) explained the use of statistics in qualitative research, whereas Pfaffenberger (1988), Patton (1990), Tesch (1990), Brent (1992), and L. Richards and T. Richards (1992) all described the use of computers. Focusing on verbal protocols, Hunter (1990) discussed the levels of analysis that computers can perform on texts. Researchers even describe specific computer techniques they used for data collection and analysis, such as logical programming (Shelly, Archambault, Sutton, & Tinto, 1986), database management systems (Blackman & Clevenger, 1987), graphic presentation of online searches (Lin, Liebscher, & Marchionini, 1991), and the repertory grid technique (Dillon & McKnight, 1990; Kwasnik & Jorgensen, 1992; Latta & Swigger, 1992).

Yet, quantitative research considers method and general applicability of results of primary importance, whereas qualitative research is guided by the belief in the primacy of *subject matter* over method (Diesing, 1971). Qualitative researchers maintain that each approach has its merits, and that the method to be used, whether quantitative or qualitative, should be determined by the problem to be investigated and its specific conditions. This plurality of methods is foreign to IR research, which traditionally invested much effort in finding the optimal method: controlled vocabulary versus free-text searching, intellectual versus automated indexing, or intermediary versus user searching. Recently, however, the idea that these methods complement one another rather than compete with each other is receiving increased support. Similarly, qualitative methods are gradually taking their position as viable research methods alongside the quantitative ones.

One way to define qualitative research is by the abstract constructs involved. Thus, Barnett (1983, p. 1) described qualitative science as being a "science of form, pattern, shape, design, or configuration." Another way to view qualitative research is by the techniques used. J. Lofland and L. Lofland (1984, p. 1) explained that "Qualitative research uses the data *collection* techniques of participant observation and/or intensive interviewing and data *analysis* techniques that are nonquantitative." However, even this general definition might be misleading, as Van Maanen, Dabbs, and Faulkner (1982, p. 15) cautioned:

If anything, it appears qualitative research is marked more by a reliance upon multiple sources of data than by its commitment to any one source alone. Thus, technique-dependent definitions for qualitative work will not suffice for

they are unlikely to encompass the diversity of uses to which its good but murky name is put.

Reflecting this diversity is the variety of names given to qualitative research: ethnography, anthropological methods, interpretive research, field research, fieldwork, grounded theory research, naturalistic inquiry, observation, participant-observer method, and case-study method.¹ Although each name represents a unique approach, they all share a set of characteristics that *together* define qualitative research.

CHARACTERISTICS OF QUALITATIVE RESEARCH

The qualitative approach offers the best methods for *exploring* human behavior. It is exploratory because it is the best for investigating complex phenomena when very little is known about them, and it is not usually employed for studying retrieval systems from purely mechanical or computational perspectives. Indeed, most IR studies that used qualitative methods focused on users and investigated human behavior in relation to information seeking and retrieval. Researchers explored questions such as how people looked for information, how they interacted with an information system, how they decided what information to pursue, and how they categorized and classified documents and information.

The human-oriented and exploratory nature of qualitative studies created a set of characteristics typical of qualitative research. From a methodological standpoint, a qualitative project would have almost all of these characteristics. Most books about qualitative research discuss these characteristics in one way or another, but Patton (1990) and Taylor and Bogdan (1984) are most useful because they list them explicitly. Based on these lists and on other discussions, the following is a description of the characteristics of qualitative research with examples from IR research.

Qualitative Research Is Nonmanipulative and Noncontrolling

Qualitative research aims at understanding people from their own point of view. Its purpose is to describe how people behave and to understand why they behave the way they do; it neither determines cause and effect, nor tests hypotheses or theories that researchers might have about human behavior. This insight and understanding of human behavior may be based on "studying real-life situations as they unfold naturally" (Patton, 1990, p. 40), or on elicitation of respondents' thoughts and opinions about the investigated question.

Smithson (1990) followed graduate students who were required to write a short dissertation and examined how they went about looking for information. Sullivan and Seiden (1985) wanted to discover problems and difficulties users had with OPACs. They asked 13 respondents to search a set of five prepared questions and based their analysis on thinking-aloud, verbal protocols recorded while searching. Similarly, Chen and Dhar (1991) investigated cognitive processes involved in searching an online catalog. They collected verbal protocols and transaction logs from 34 interactions

¹ A case study can be qualitative, quantitative, or both. The "case-study method" is a name of a qualitative research approach (Fidel, 1984a).

between users and reference librarians, and 30 interactions between users and the catalog.

The responsibility of recording situations as they unfold can also be delegated to respondents. The most common method is to ask respondents to write journals or logs. For example, in a study about the use of the U.S. National Technical Information Service (NTIS) in academic and public libraries, McClure, Hernon, and Purcell (1988) asked participating reference librarians to record daily logs and to assess the type and frequency of NTIS-related questions.

Some studies base their analysis on the ideas and opinions of respondents. Liddy (1991) solicited the professional opinion of 12 expert abstracters about the structure of empirical abstracts in order to determine what this structure was. This guided her linguistic analysis, which uncovered structure-related lexical clues. Her four-stage method of eliciting abstracters' opinions was highly structured and rigorous, and was tailored to the research question at hand. Dillon and McKnight (1990), on the other hand, used the ready-made repertory grid analysis to study how users describe their uses of different texts, and developed a classification of types of texts according to user-perceived differences. This classification can help determine how best to represent nonlinear text in hypertext.

A methodology developed especially to study the needs, images, and satisfaction of users from their own point of view is the sense-making approach. Dervin (1992), who developed the method, explained that it is neither purely quantitative nor qualitative, but rather includes both, and therefore is a third kind, and that it "provides a theory of how to conduct interviews with respondents" (p. 70). For example, in the time-line interview, the respondent is asked to reconstruct a recent situation as a sequence of momentary events, the time-line steps. Each event is recorded, say, on a card. The investigator then asks the respondent to describe in detail what happened at each event, depending on the purpose of the study.

Modified versions of the time-line interview were employed in several studies. Fletcher (1991) examined the range of situational dimensions in information behaviors that are perceived and reported by top-level managers in both the public and private sectors, and Schamber (1991) investigated the criteria users employed to determine what would resolve their information need or problem when they evaluated the results of information searches in multimedia environments. In addition, Jacobson (1991), who provided a detailed description of the time-line interview, studied the ability of novice users to search NEXIS. All these studies were based on users recalling their actions and thoughts after the investigated process was over. Hert and Nilan (1991), on the other hand, interviewed respondents while they were in the process of searching an online public access catalog (OPAC), in order to explore various aspects of actions users performed.

Although the purpose of qualitative research is to understand a phenomenon as it is seen by respondents, Chen and Dhar (1990) brought an interesting twist to the user-perception characteristic. They observed 30 business school students searching for documents within a subject area of their interest, and developed a taxonomy of misconceptions that students had about subject searching. The ultimate goal of their project was, of course, to find ways to improve help by an intelligent component for user modeling that can suggest search options to users.

Qualitative Research Is Both Holistic and Case-Oriented

At first sight, these attributes seem contradictory, but they are actually two sides of the same thing because one cannot exist without the other. Qualitative research provides for broad understanding of a particular phenomenon by focusing on unique cases, but at the same time taking into account *all* the themes that are involved. Johnson (1975, p. 4) explained that "Qualitative research affords us an in-depth, detailed, descriptive account of social actions occurring at a specific place and time." On the other hand,

The holistic standpoint includes the belief that human systems tend to develop a characteristic wholeness or integrity. They are not simply a loose collection of traits or wants or reflexes or variables of any sort...; they have a unity that manifests itself in nearly every part. (Diesing, 1971, p. 137)

Case orientation assumes that each case is unique in its situation and context, and generalizations should be carefully developed, or not made at all.

This characteristic is one of the weakest parts of IR research. Whereas each phenomenon studied occurred within a unique context, it is not always clear how sensitive researchers were to this context. A study, say, of students searching a clumsy OPAC in an underfunded library, which nevertheless claims to present general patterns of searching behavior, is a familiar scenario. Another tendency, also left over from quantitative research, is the focus researchers sometimes put on only a few qualities of interest, and ignoring others.

Although sparse, IR research has some examples of true holistic and case-oriented studies. Usually their holistic nature is manifested either along dimensions of time or of space. For instance, various investigators have examined the search process from its very inception to its conclusion, although their research question addressed only a part of the process (e.g., Hancock, 1987; Hancock-Beaulieu, 1990; Smithson, 1990). Sensitive to the space dimension, Kwasnik (1991) and Case (1991) considered the physical setting and the importance of the situation in which the activity took place when they studied how faculty labeled and sorted documents and text.

Kuhlthau's work (1983) is one of the best examples of holistic research. She investigated high school seniors in advanced placement English classes and eventually developed a model of the affective aspects of the search process. She looked at many aspects and activities before, during, and after the search. The data that she gathered covered multiple aspects, such as feelings, thoughts, and actions related to the search, sources used, procedures for finding sources, usefulness of sources, teacher's evaluations of each student project, and student's perceptions of library use and of the progression of the search.

A few research projects have highlighted case orientation. In a pilot study to create a model of communication during the design process, Sonnenwald (1992b) analyzed two case studies in depth. One was of designing a house as discussed in a book, and another was of developing an expert system from descriptions in published and unpublished reports and by assistance from participating designers. Hjørland (1988) analyzed a description of the search process and the strategies used for dissertation research in psychology as the research was presented in the dissertation itself. Endres-Niggemeyer, Waumans, and Yamashita (1991) presented the ultimate holistic and case-oriented approach because they studied themselves. To create a model of the

process of summary writing, or abstracting, the researchers were the respondents as well. They recorded verbal protocols while they were writing summaries of introductory chapters found in two Prolog textbooks. They began with the first inspection of the original text and ended after the summaries were all prepared.

Qualitative Research Focuses on Processes

As a method of studying human behavior, qualitative research centers on processes. It neither provides snapshots nor concentrates on products. It examines the dynamics of a process (e.g., interaction during a search), rather than the static attributes of a process (e.g., users' level of education, cognitive styles, or system capabilities).

A large proportion of qualitative research in IR examined the search process. A number of such studies made inquiries into the whole search process, like that of Ingwersen (1982), which investigated the search process as performed by librarians and users of a public library, from the moment that a need was identified to the conclusion of that need. Other researchers focused on sections of the search process. Saracevic, Mokros, and Su (1990) analyzed the reference interview in an academic library, whereas both Lynch (1978) and Dewdney (1992) investigated the same process in public libraries.

Another part of the search process that has attracted interest is interaction with the information system. At one end of the expert-novice spectrum, Fidel (1984b) observed five life-sciences librarians performing searches on bibliographic databases. At the other, Solomon (1992) examined IR behavior of children in grades 1 through 6 searching an OPAC in an elementary school library. He explored overall patterns that influence success and failure as well as intentions, moves, plans, strategies, and search terms. Dalrymple (1990) compared searching behaviors by observing 20 students using a card catalog to answer 6 assigned questions and 20 others using a comparable online catalog. Efthimiadis (1992) narrowed this focus even further. He investigated the process of interactive query expansion when he performed 25 INSPEC searches for users on a system with relevance feedback, term weighting, and ranking.

Whereas most qualitative research in IR concentrated on user behavior, whether searching for information or using information systems, some studies looked into the design process. An example of a specific activity is writing abstracts. Endres-Niggemeyer (1990) analyzed verbal protocols, texts, abstracts of texts, and abstracters' knowledge in order to describe the process of writing abstracts, and the strategies and knowledge that were employed. More generally, two projects examined case studies in order to describe the design process as a whole. Cohen and Howe (1989) analyzed three case studies from their own work that illustrate the design of knowledge-based systems. Based on their analysis, they then developed a descriptive model of the research cycle in empirical artificial intelligence, focusing on the role of evaluation. Sonnenwald (1992b) was planning to build a model that describes characteristic communication over time among users, designers, and developers of information systems, from initial system conceptualization to system installation and use. She assumed that design processes have inherent attributes that are beyond their context. To propose a design model, she conducted a pilot study in which she analyzed two case studies in depth, one of designing a house and another of an expert system.

Qualitative Research Is Open and Flexible

The qualitative approach employs no a-priori conceptual framework in which observed data are supposed to fit. Because qualitative researchers recognize that all investigators, whether qualitative or quantitative, always bring some a-priori conceptions to their inquiry, and that no observation can be purely objective, they attempt to be open to whatever emerges during their inquiries. Taylor and Bogdan (1984) explained that researchers suspend, or set aside, their own beliefs, perspectives, and predispositions. J. Lofland (1976) captured the investigator's position succinctly in pointing out that the stance of the *radically naive* person is required for qualitative research. This stance is necessary to facilitate discovery, which is one of the most powerful attributes of qualitative research.

A large proportion of studies in IR did not take this stance; they were carried out to validate a preconceived idea, model, or theory, even when they employed qualitative methods. Only a few research reports admit to initial innocence or naivete, and most of those are dissertations. Based on her experience as a reference librarian, Zaporozhetz (1987), for example, was motivated to study how faculty advisors prepare their doctoral candidates to perform literature reviews. She felt that even doctoral students have library anxiety, but they are left on their own to cope with library research. When approaching the study, she had only questions and no theories. Solomon (1991), unlike Zaporozhetz, was deliberate in his naivete. At first, he tried to just passively observe children searching an OPAC to gain an understanding of the process; only afterwards did he start his active investigation.

Openness to what emerges from the study usually implies flexible design. Patton (1990, p. 41) pointed out that the qualitative researcher is "Open to adapting inquiry as understanding deepens and/or situations change...[and] pursues new paths of discovery as they merge." This means that, most often, the design of a research project progresses with the project itself. In fact, most studies that are highly exploratory cannot be designed in detail ahead of time. Unfortunately, very few of the IR studies reviewed here employed flexible design. Ellis (1989) interviewed 47 researchers to examine the perceptions of academic social scientists on their own information-seeking activities. In the course of the interviews, he realized that representatives from a group of scientists were missing in the initial sample. He then selected the needed individuals and interviewed them. In addition, he had initially planned to choose the second sample from a certain academic department, but an examination of the interviews of the first sample suggested another approach.

A change in plans also occurred in Chatman's (1983) project. To probe the diffusion of information among the working poor, she had originally planned to tape the interviews with the respondents. Once in the field, however, she discovered that this action intimidated respondents and therefore she wrote her field notes immediately after completion of the interviews despite the anxiety that this method caused her. Michel (1992) had a similar experience. He investigated searching behavior and interaction with the file structure provided by the library, both as a whole and by each of its parts. Initially, he thought that he would collect data by observation only, but then he decided to include verbal protocols and interviews to supplement his observation.

Solomon (1993), who observed children searching an OPAC, relayed his experience vividly:

The idea was to develop a baseline of data about the OPAC transaction before moving to a more active participant observer role. The children did not let me assume this initial passive role. The site was, after all, a school where children are encouraged to seek help or ask questions. They did so, and many of my early questions were answered without having to be asked.

Later on, as I was able to absorb, process, and understand the behaviors that I was observing, I began to have additional questions. In order to limit the impact of my presence I tried the approach of asking questions subsequent to and separate from the observations of OPAC transactions. This approach did not work, since formal questioning separate from the OPAC transaction was either intimidating to children or so disassociated from the transaction that response was not possible. Thus, I took the approach of integrating observation and questioning. The questioning became a nonthreatening, informative, and natural part of the children's use of the OPAC.

These examples show that qualitative research is iterative. Rather than performing data analysis after the completion of data collection, data analysis guides data collection (Fidel, 1984a). Barry (in press), in her dissertation research, gave an indirect but illuminating example of the advantages of the iterative approach. She explored the criteria users of an academic library employed when they decided whether or not to pursue information. She decided to separate data collection from data analysis to reduce researcher bias in questioning. She observed, however, that

...this separation of the interviews from the content analysis also presented a disadvantage. As has been described, each response was probed until the researcher felt the respondent was offering no new reasons for having marked an item. The decision to stop probing was essentially a judgment call by the researcher. Once content-analytic schemes had been developed and were used to code responses, it was apparent that many responses had not been sufficiently probed. Responses that seemed reasonably straightforward during the interview often seemed ambiguous when it became necessary to decide which coding categories had been mentioned in the responses. This lack of sufficient probing increased the difficulties in developing and applying content analytic categories.

Qualitative Research Uses Multiple Methods

Typically, in qualitative research, a project uses more than one method or technique of data collection. This characteristic is called methodological triangulation. Quantitative research often employs multiple methods as well, but usually each method measures a different quality. For example, questionnaires may determine which features of an information system respondents liked best, but transaction logs would point out the one they used most frequently. In qualitative research, investigators employ a variety of methods that complement one another, to study the same phenomenon or process. This variety is needed to overcome deficiencies in each method.

IR research is rich with examples of triangulation. Puttapithakporn (1990) gave a typical example in a study for developing a taxonomy of user problems and errors based on data collected from 33 searches performed on the ERIC database by students of a library school, using the Silver Platter interface. The study included observation of the search process, a questionnaire that inquired about users' perceptions of problems and difficulties, and selected interviews. Studies of the search process often collect verbal protocols recorded while searching, and documents of various kinds. Grover and Glazier (1992), for example, collected managers' documents and correspondence, in addition to making observations and conducting interviews, when they examined how city managers routinely collected, assimilated, and disseminated information.

Moore and St. George (1991) were creative in using different kinds of methods when they made inquiries into the cognitive difficulties that sixth-grade children in a New Zealand school encountered during a search in the card catalog for a class project. They videotaped the search process with the children thinking aloud. They then showed participants their tape and asked them to describe the search retrospectively. They also analyzed various documents, such as the search form and the students' completed assignment.

Although interview, observation, as well as document and log analysis are used together in a number of studies, the selection of the methods to be used in a particular study is determined by the research question. Case (1991), for instance, investigated how historians labeled and sorted relevant passages of text, as well as their experience in searching through these items. For each respondent, he examined the distribution of stacks of papers and books in the office and made sketches of the workplace. Similarly, Michel (1992) observed objects, such as library signs and other library aids, and the physical as well as cognitive behavior of 49 users looking for information in six public and academic libraries.

Triangulation in IR is already entering a technological age. Hancock-Beaulieu, Robertson, and Neilson (1991) integrated several methods of data collection into one enhanced logging facility that is a front-end interface to an OPAC.

An excellent example of the use of diverse techniques to examine various aspects of the search process was provided by Kuhlthau (1991), who delineated a series of longitudinal studies. Ingwersen and Pejtersen (1986) provided an overview of methods and techniques when they described empirical studies of user requirements that aimed to make the design of information systems more compatible with user needs. They summarized the methods that they used.

Qualitative Research Codes Data

As Mellon (1990) observed, data analysis in qualitative research is much like indexing or classifying: It involves fitting qualities into categories. This type of analysis is more commonly called coding. Researchers analyze units of data, determining to which category each belongs.

Coding can be performed simultaneously with observation, or through content analysis where elements of text are the units of analysis. Structured observation (Glazier, 1985) is a method of data collection in which a list of predetermined categories guide data recording. The investigator observes respondent behavior and

the investigator gains a personal understanding and insight. To that end, investigators need to be sensitive to the effects of their research on the people they study, and they value all perspectives. Because of the special nature of this type of research, Patton (1990, p. 41) called for empathic neutrality:

the researcher's passion is understanding the world in all its complexity—not proving something, not advocating, not advancing personal agendas, but understanding; the researcher includes personal experience and empathic insight as part of the relevant data, while taking a neutral nonjudgmental stance toward whatever content may emerge....

The relationship between researchers and respondents is rarely addressed in IR research. An exception is a report by Chatman (1984) that describes this aspect of her dissertation research. She investigated the diffusion of information among people who were involved in the Comprehensive Employment and Training Act (CETA) programs in the city of Berkeley through observations and interviews. She expressed the respect she bore for the respondents and explained: "I felt privileged to have shared the life existing within such a deceptively neglected and dilapidated-looking building" (Chatman, 1983, p. 127). She also exercised empathic neutrality (pp. 128-129):

My encounter with the women's refuge center brought a challenge to the research that continued in various degrees of frustration throughout the field experience. That challenge was to not let an emotional identification with a particular agency's people and problems hinder my efforts to generate concepts which were needed to illuminate the data I was gathering.

It is possible that IR researchers chose to ignore the issue of researcher-respondent relationships because they were dealing with cognitive, rather than emotional, behavior. After all, they were looking at thought processes, not at pain, suffering, or love. Holistic inquiry, however, cannot ignore affective processes because there is no proof that they are completely divorced from thought processes. In fact, it is plausible to assume that feelings such as frustration or anxiety have an effect on human behavior in relation to information search and retrieval.

It is also possible that IR researchers avoided the issue because they did not think it was relevant to their inquiries. Most examples of investigator-respondent relationships in the methodological literature were drawn from studies of cultures that were different from those of the investigators. Most IR researchers, on the other hand, focused on the information-related behavior of people much like themselves: professionals and scientists. The issue of the investigator-respondent relationship, however, is pertinent to the credibility of IR research, even though some specific examples from the sociological or educational experience may not be directly relevant. IR research might need to develop its own interpretation and procedures to address this issue. One principle can serve as a starting point: to gain personal understanding and insight, an investigator should be nonjudgmental, truly respectful of respondents, and genuinely interested in them and their activities. Even this basic theme is not always apparent in IR research. Developing specific procedures would help researchers to improve the quality of their inquiry.

Qualitative Research Is Inductive

If asked to choose a single attribute that is most typical of qualitative research, most methodologists would probably select this characteristic. Taylor and Bogdan (1984), and Patton (1990), put this characteristic at the top of the lists of attributes they provided in their books. In addition, inductive research is central to both leading approaches in qualitative methodology: grounded theory (Glaser & Strauss, 1967) and naturalistic inquiry (Lincoln & Guba, 1985). Furthermore, most of the methodological developments associated with qualitative research focused on procedures for inductive data analysis. Yet, the indicative approach and inductive analyses have been seldom used in IR research.

The inductive approach requires that abstract constructs, such as hypotheses, models, or theories, be developed during a study, not conceived *a priori*. As a result, both the method of inquiry and the abstract construct are dynamic, evolving as the study progresses. Typically, data analysis, which guides data collection, involves clustering like things together and the overall structure of the construct emerges as analysis progresses. Thus, flexible design, the use of multiple methods, and coding data are needed for inductive analysis to take place.

It is difficult to describe this characteristic in IR research because although some researchers reported that they had analyzed data inductively, only a few actually described this analysis (e.g., Barry, 1993; Ellis, 1989; Fidel, 1984a; Solomon, 1991). An example of an inductive approach is Mellon's (1986a, 1986b) project that explored the feelings of students at a southern university as they did research in an academic library for the first time. Students kept journals of the searches that they did; they described the search process and their feelings about it. They also wrote an in-class essay on their feelings before, during, and after the library search. Mellon analyzed the data for each semester, using the constant comparative method (Glaser & Strauss, 1967). This method guided her inquiries during the next semester.

Indicative analysis requires procedures that are new to IR research. It is important, therefore, that researchers who have used this analysis describe it in detail.

Qualitative Research Is Scientific

Early literature in qualitative research was concerned with responding to criticism about the scientific credibility of the methods used. Defending against the main lines of attack, methodologists focused on the reliability and validity of qualitative methods, which are logical positivism's criteria for scientific credibility (Svenonius, 1990). Both attributes have been the focus of methodological discussions, as illustrated by Sage Publications' dedication of the first book in its series about qualitative research to this topic (Kirk & Miller, 1986).

Today, most methodologists agree that the notion of reliability, as construed in quantitative research, does not apply to qualitative research. Qualitative studies cannot be replicated because they examine a phenomenon at a certain point in time, and because they are flexible, dynamic, and creative. Nevertheless, reliability was often an issue of concern in IR research, particularly in studies that employed content analysis. In these studies, investigators measured intercoder consistency to test the reliability of their analysis. The experiences of some of these researchers, however, show that there might be a trade-off between reliability and complexity. Schamber (1991), Dewdney

(1992), Barry (in press), and Tibbo (1993) concluded that consistency was high for straightforward situations but dropped drastically for complex or abstract ones. Thus, researchers who believe that reliability is the ultimate criterion for quality, may be forced to confine themselves to studying simple, straightforward situations.

The IR researchers just mentioned did not follow such a confining path. They employed intercoder consistency checks to improve the validity of their research by resolving inconsistencies. Validity is of great concern because of the dynamic and creative nature of qualitative research, and because of its openness and flexibility. Here again, it is difficult to determine the degree to which IR researchers were concerned about validity, because strategies to enhance validity are seldom reported, particularly in the literature before 1991. Studies that have addressed their own validity, however, propose a variety of methods for improving the validity, and hence the scientific quality, of research projects in IR.

Triangulation, when used to observe the same phenomenon, is a common method of ensuring validity. Grover and Glazier (1985), for example, checked findings derived from structured observation by comparing them to the results of both interviews and analyses of written records. Similarly, Moore and St. George (1991) checked nonverbal behavior during searching, as it was recorded on videotape, to validate their analysis of the tapes' transcripts. The member check method, however, is often considered the most crucial method for ensuring validity. Using this method, researchers present their findings to the respondents and ask for their opinion. Although it has been used by others (e.g., Fidel, 1984a; Solomon, 1991), Kwasnik (1989) found a creative way to implement it. After she investigated the way in which faculty sorted their mail, she created a formal model of the process. She then returned to four faculty offices and sorted their mail according to the rules she had developed. Another method of enhancing validity is peer examination, where researchers ask their colleagues to test the validity of their observations, and inferences (e.g., Fletcher, 1991; Hert, 1993; Michel, 1992; Schamber, 1991; Solomon, 1991).

Although these methods are already established in qualitative research, the notion of how to construe validity in the context of qualitative research is still evolving (e.g., Corbin & Strauss, 1990; Maxwell, 1992; Ratcliff, 1983). Hert (1993), for example, is planning to use four criteria that were suggested by Guba and Lincoln (1989) to enhance the quality of her project: credibility, dependability, confirmability, and transferability. Michel (1992), on the other hand, collected criteria from various sources to evaluate his research and the resulting model. He evaluated his model according to internal consistency and empirical validity. The first criterion tests how easily the model can integrate new concepts and to what degree concepts are used consistently throughout the model. Empirical validity is supported by definitions that can be operationalized and by the ability to generate hypotheses from the model. The ultimate criterion, he claimed, is the degree to which others adopt the model.

Even though the notion of validity was first introduced as a somewhat defensive tactic, its essential contribution to the quality of qualitative research cannot be overemphasized. In fact, a few discussions about validity provide the best guidelines for performing high-quality research. A case in point is the book by Ericsson and Simon (1993), which is the classic text about collection and analysis of verbal protocols; it was originally written to explain how such protocols can provide valid data. Lee (1989) presented a more direct example when he suggested a method for MIS case studies that stands the test of scientific credibility. Similarly, Hernon and McClure (1987)

described how to conduct improved unobtrusive testing when they discussed issues relating to reliability, validity, and utility.

Qualitative research is scientific because:

Qualitative study is not an impressionistic, off-the-cuff analysis based on a superficial look at a setting or people. It is a piece of systematic research conducted with demanding, though not necessarily standardized, procedures. (Taylor & Bogdan, 1984, p. 7)

Patton (1990, p. 11) revealed the secret for achieving quality research:

The validity and reliability of qualitative data depend to a great extent on the methodological skills, sensitivity, and integrity of the researcher. Systematic and rigorous observation involves far more than just being present and looking around. Skillful interviewing involves much more than just asking questions. Content analysis requires considerably more than just reading to see what's there. Generating useful and credible qualitative findings through observation, interviewing, and content analysis requires discipline, knowledge, training, practice, creativity, and hard work.

THE RELEVANCE OF QUALITATIVE RESEARCH TO LIS

This tour of the qualitative world of IR research shows that among researchers who employed qualitative methods, only a few adopted the methodological approach. Almost all projects focused on the user's perceptions, looked at processes, collected qualitative data, and used more than one method. However, only a handful were approached from a holistic and case-oriented standpoint, were flexible and open, were sensitive to researcher-respondent relationship, were inductive, and deliberately used methods to enhance validity. It seems that the positivistic spirit still influences IR research (Budd, 1993), even when qualitative methods are employed.

It is specifically those characteristics which have been neglected that make quantitative research relevant to LIS research. Three interrelated factors brought qualitative methods to the attention of LIS researchers: (a) the failure of quantitative methods to produce what was expected of them; (b) the move toward a user-centered approach; and (c) the growing interest in qualitative methods in other areas in the social sciences.

Various researchers addressed the shortcomings of previous research. They pointed to its reductionist approach to complex situations that excludes the study of individual, situational, environmental, and historical conditions. Experience shows, however, that these conditions are essential to information-related behavior. Hernon and McClure (1987) observed that successful performance in reference interviews tended to be associated with individual attributes more often than with institutional ones. In addition, Mick, Lindsey, and Callahan (1980) found that environmental and situational constraints play a major part in determining information behavior.

Several researchers analyzed the research done in their specialty, pointed to its limitations and problems, and explained how the qualitative approach provides remedies. Wilson (1981) looked at user studies in IR research, Fidel (1987) at online

searching behavior, Neuman (1989) at computer-based instruction, Orlikowski and Baroudi (1991) at MIS research, and Sonnenwald (1992a) at research about design.

Ellis (1992) took a broader view to explain the failure to develop a powerful body of theory in IR. He defined and described two paradigms that have been operating in IR research. The most traditional one is the physical paradigm that is best demonstrated by the Cranfield studies. Increasing discontent moved researchers toward the cognitive paradigm. However, the irreducible duality in IR research, he explained, prevents the development of a powerful theory. The physical paradigm focuses on things and artifacts, and the cognitive one on people. Whereas IR research requires that both be investigated, neither paradigm by itself can do so.

A recent phenomenon in IR research is the emergence of the user-centered approach. Although users have always been considered essential to IR processes, they were studied, manipulated, and controlled, but not involved as major players. During their peak, user studies aimed at finding variables that would predict use patterns. A user-centered approach, however, implies that information-related phenomena are studied from the user's perspective and that system design and evaluation are centered on the user, not the system. This means that each user is unique, operating within a certain context and affected by situational conditions. Carr (1990, p. 97) illuminated:

To know the value of information institutions, it is essential to study the lives and situations of their users without diminishing them. Human beings are more than demographic patterns, attendance records, and economic profiles; they are deeply involved participants in a formative collective drama.

Nilan and Hert (1992) demonstrated this approach when they presented a generalized method for incorporating user problem-solving processes into system design. Savolainen (1993) called for a shift from an intermediary-centered approach to the user-centered one, and showed how the sense-making theory can be applicable to LIS.

The growing interest in qualitative methods in the social sciences has also influenced researchers in LIS. Harris (1986) suggested that LIS should join the move away from the positivism typical of contemporary social sciences, because it cannot satisfy requirements that are essential to LIS research, namely, being holistic, reflective, empirical, and dialectic. Grover and Greer (1991) observed that technology in the "information age" brings together information-related elements that have previously been isolated and necessitate a holistic approach.

Recently, in a conference about the historical, empirical, and theoretical perspectives in LIS (Vakkari & Cronin, 1992), several speakers proposed new theoretical frameworks, such as hermeneutics (see also, Benediktsson, 1989), cultural historical perspective, cognitive viewpoint, general system view, and the new cybernetics. Joining these various schools is Radford (1992), who proposed the work of Michel Foucault as a new conception for LIS. Most researchers recommended a nonreductionist and interdisciplinary view.

Although it is a social science, and an interdisciplinary one at that, LIS might need to develop its own qualitative methods and procedures. It would be useful if investigators described not only the findings of their investigations, but also their methodological path, with all its challenges, retreats, and successes. With such descriptions, LIS can inductively develop a methodological framework and a set of procedures adequate for its own research.

HOW TO LEARN ABOUT QUALITATIVE RESEARCH

When I started my dissertation research about 13 years ago, I knew of no established researcher in LIS who employed qualitative methods. Today, the numbers are encouraging. There are already a few seasoned qualitative researchers in LIS who can (and do) direct research. Because much new research starts at the doctoral level, the results are already apparent: At least 16 dissertations with qualitative components have been completed since 1986, and 4 evolving dissertation projects are excellent examples of qualitative research (Forrest, 1992; Hert, 1993; McGregor, 1992; Pitts, 1993).

A qualitative research project presents a major dilemma to the investigator. On the one hand, exploratory research provides a potential for true discoveries, whereas experiments often do not result in a major contribution to the knowledge in the subject area. On the other hand, it might seem risky. "What if I don't find anything? It does not mean nothing exists; it only means I couldn't find it."² Experiments, on the other hand, are failure-proof: Even if one does not find anything, it is enough to demonstrate that one knows how to conduct an experiment and analyze the data.

With all its requirements, qualitative research brings promising returns. It is an excellent long-term investment because it provides a substantive basis on which to build a research career. An in-depth understanding of a phenomenon provides the researcher with insights that guide future research. In addition, exploratory studies, because they are inductive and holistic, accumulate a wealth of data that can be analyzed for many years to come. Some examples of such secondary research are works by Chen and Dhar (1990), Fidel (1985, 1986), Kuhlthau (1988), and Kwasnik (1993).

If a library school does not offer a course in qualitative methods, one should look for guidance elsewhere. Today, most research universities have at least one faculty member who specializes in qualitative methods, and offer at least one course on the subject. In some settings, researchers form study groups and meet periodically to exchange progress reports, to examine inferences, and to suggest new strategies to one another (Hert, 1993). Working with researchers from other areas, whether on an individual basis, in groups, or in the classroom, is most often an enriching experience.

It is useful for the novice qualitative researcher to have a mentor who can guide the learning process as well as provide constant methodological support. It is not always possible to find a person, or a group of people, who can serve in this capacity. In such cases, the writings of experienced researchers can be a satisfying substitute. Throughout my dissertation research I turned to Diesing (1971) and to the first edition of Taylor and Bogdan (1984) whenever I encountered methodological difficulties or when I had doubts about strategies. Glaser and Strauss (1967) were most useful when I needed to defend my method and prove its credibility. Other individuals may find other writings to be most useful to them.

Books about qualitative research are of two types: those that discuss the methodology (i.e., the system of principles and practices applied) and describe its theoretical underpinning, and those that describe actual methods and techniques.

² Experience taught us that no one had ever failed to find something to report about. One just had to look hard enough.

Among the methodological books, Glaser and Strauss (1967) coined the term "grounded theory" to reflect the inductive nature of qualitative methods where theory is discovered from data. They explained that this approach is most promising in closing the gap between theory and practice in the social sciences. The book covers the process involved in the discovery of theory, and was the first to explore in depth issues such as theoretical sampling, the constant comparative method, the flexible use of data, and the credibility of grounded theory.

On a larger scale, Lincoln and Guba (1985) proposed *naturalistic inquiry* as a new paradigm for the sciences. They selected this name because "...first, no manipulation on the part of the inquirer is implied, and, second, the inquirer imposes no a-priori units on the outcome" (p. 8). The first part of the book explains the need for a new paradigm to replace the positivistic one, and argues for the adoption of the naturalistic paradigm. The second part illustrates the methodologies that the new paradigm implies, including methods and procedures for designing and implementing naturalistic inquiry, processing data, and case reporting.

Unlike the previous teams, Diesing (1971) was more of an observer than a participant and did not explicitly advocate a certain approach to social science research. He explained that his book is midway between "how-to-do-it" books and "scientific method" books that provide abstract discussions of science in general. The first part is dedicated to formal methods and theories, and the second to participant-observer and clinical methods. In the second part he described the holistic standpoint, the characteristics of holistic theories, and weaknesses and problems of case study methods. In a later book, Diesing (1991) described the predominant schools of thought in this century from logical empiricism to hermeneutics, and how they are reflected in social science studies. His purpose is

to get at the actual practices and influences, conscious and unconscious, that lie behind the official procedures and rules that people are taught to follow...[and for readers to] develop a greater self-awareness, and also an understanding of alternative approaches to research. (p. ix)

Most books about qualitative methods and techniques are written in a personal style, and draw much information and insight from the authors' own experience. In a way, the authors are participant observers studying their own research process, and the books are their research reports, making public their private knowledge and understanding. Even writings that explain how to do qualitative research from the most practical perspectives provide no recipes. As Burgess (1982) clarified: "[How to do] field research depends upon the researcher, the researched, the problems posed, the methods of investigation that are used and the data that are gathered" (p. 9). The best that authors can do is describe their own understanding and insights.

Typically, such a book is written in an accessible and straightforward style. It includes detailed examples, may even include research reports in their entirety, and is useful to readers at various levels of expertise. Unlike books about statistics and other quantitative methods, most books about qualitative methods include some descriptions of the theoretical frameworks and the various schools of thought that led to the emergence and establishment of the qualitative approach. This is because qualitative research is contextual. Researchers reporting on their own work usually describe their

background and perception. In addition, to select the best methods and techniques, it is necessary for readers to understand the theoretical framework of their work.

Books about qualitative methods and techniques are of two types. Books of the first type cover a variety of aspects of qualitative research, similar to general textbooks, such as those by Bogdan and Biklen (1992), J. Lofland (1976), Mellon (1990), Merriman (1988), and Patton (1990). Of the other type are books that focus on how to conduct qualitative research, much like a handbook. Glesne and Peshkin (1992), J. Lofland and L. Lofland (1984), Spradley (1979, 1980), Taylor and Bogdan (1984), and Yin (1989) are examples of books that cover all aspects of the research process, whereas Glaser (1978), Miles and Huberman (1984), Strauss (1987), and Strauss and Corbin (1990) focused on data analysis. Taking only one aspect of the process, Ericsson and Simon (1993) addressed the collection and analysis of verbal protocols, and Marshall and Rossman (1989) dealt with the design of qualitative studies. Some authors directly related their personal encounters. Johnson (1975) delineated all the stages of the research process by describing his investigations of social welfare activities. Similarly, Whyte (1984) related his experience in organizational behavior research when he described how to carry out a field research project, how to integrate research methods, how to integrate research with social action, and the process by which he arrived at research ideas.

Both textbooks and handbooks are rich sources for practical help and methodological support. One may want to consult all of them; each will have a unique contribution to the understanding of qualitative methods and to the specific research project.

Another source of information is collections of articles. Glazier and Powell (1992) edited a collection about techniques applicable to LIS. The book includes descriptions of methods used in specific research projects, and also general discussions on the use of qualitative methods in areas such as visualization, library decision making, and LIS education. A comprehensive selection by Burgess (1982) covers all stages of the research process, and its multiple aspects. The collection includes both British and American research with contributions by leading researchers and theoreticians such as Glaser, Whyte, Becker, and Geer. In later collections, Burgess (1986, 1989) presented a sample of sociological work in which contributors described the way in which they conducted their research on subjects such as gender and family, work, health and illness, religion, and power distribution in the modern state.

Of a different nature is the contribution of Shaffir and Stebbins (1991). In this collection, authors described their social and emotional experience doing field work, addressing situations such as being a female researcher in a male-dominated setting, dealing with power relations, and leaving and resuming research. Unlike most recent writings, older collections highlight the differences between quantitative and qualitative methods, and might even be somewhat defensive. Because they are in early collections, however, most articles deal with basic concepts of qualitative research. McCall and Simmons (1969) addressed issues such as the role of the participant observer, qualitative data as a source for hypothesis, and the constant comparison method, whereas Tyler (1969) offered many examples of various analyses of data.

Practical help may at times come from descriptions of individual research projects in areas other than LIS. Most of the authors mentioned in this section have also published their own research reports. Research in education, such as in the journal *Qualitative Studies in Education*, is a promising source. Another source is the catalog

of Sage Publications, which includes many books on qualitative research and a monograph series, *Qualitative Research Methods Series*, of more than 20 volumes. Each volume addressed a specific topic, such as the politics and ethics of fieldwork (Punch, 1986), semiotics and fieldwork (Manning, 1987), gender issues in field research (Warren, 1988), focus groups as qualitative research (Morgan, 1988), writing qualitative research findings (Wolcott, 1990), and analyzing visual data (Ball & Smith, 1992).

Closer to IR research are projects of knowledge acquisition from human experts for the purpose of building expert systems. In such projects, the knowledge engineer observes and analyzes the behavior of an expert to create eventually a formal model of this expert's knowledge. Like the qualitative researcher, the knowledge engineer aims at an in-depth description and may use various techniques of data collection and analysis. The literature in this area is growing and includes descriptions of individual projects and discussions about methods. Agarwal and Tanniru (1991), Endres-Niggemeyer (1992), Ercegovac (1992), Gains and Shaw (1993), Kawaguchi, Motoda, and Misoguchi (1991), Massey and Wallace (1991), and Shute and Smith (1993) described specific projects and methods, whereas Belkin et al. (1987), Hilal and Soltan (1991), and Karbach, Linster, and Voss (1990) examined frameworks for knowledge acquisition.

All these sources can provide much useful information and understanding. It is most important, however, to understand the philosophical foundation of research methods. Knowledge of the philosophy of science and of social science is essential to understand fully qualitative methods. This is true for quantitative research as well (Thompson, 1989). Researchers using this approach need to recognize the philosophical assumptions underlying quantitative methods. They should understand the tenets and criticism of logical positivism and be familiar with topics such as the logic of probability. In order to be creative and insightful, and at the same time rigorous and responsible, it is necessary for all researchers to understand the theoretical and epistemological foundation of the research methods they use. Philosophical perspectives are particularly important to research in LIS. As a relatively new research area, it has no "Dead Germans" (Pierce, 1992) and no methodological traditions to build upon. A theoretical and methodological understanding of research that goes beyond a mastery of techniques would contribute greatly to the quality of LIS research.

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