6 From the Mind's Eye of the User: The Sense-Making Qualitative-Quantitative Methodology

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INTRODUCTION

The purpose of this chapter is to set forth the sense-making methodological approach which has been developed since 1972 in a programmatic research effort specifically focused on developing alternative approaches to the study of human use of information and information systems. In terms of research genres as identified in the current literature, sense-making has been used to study the needs, images, and satisfactions of users and potential users of information/communication systems—in short, what users want from systems, what they get, and what they think about them.[1]

In the first section of this chapter, the underlying assumptions and theoretic foundations of the methodology are set forth. This is followed by a description of the methodology and its derivative methods. A third section presents exemplars of how the approach has been used in several different studies of users and potential users of information/communication systems. In a final section, the approach is positioned in the context of the current debates in the social sciences generally and specifically in terms of the qualitative-versus-quantitative research distinction.

Since the focus of this book is on qualitative research, it is important at this point to note that the approach described in this chapter is a qualitative approach. However, it is also a quantitative approach. It can in some senses be said to stand between methodological divisions, in that it cannot be placed at either one end or another of the many polarities that form the current contests in the social sciences: for example, qualitative versus quantitative, administrative versus critical, theoretic versus applied, structuralist versus individualist. These matters are discussed in greater detail in the final section of this chapter.

UNDERLYING ASSUMPTIONS AND THEORETIC FOUNDATIONS

The term *sense-making* has come to be used to refer to a theoretic net, a set of assumptions and propositions, and a set of methods which have been developed to study the making of sense that people do in their everyday experiences. Some people call sense-making a theory, others a set of methods, others a methodology, others a body of findings. In the most general sense, it is all of these.

It is, first, and foremost, a set of metatheoretic assumptions and propositions about the nature of information, the nature of human use of

information, and the nature of human communication. Some of the assumptions of sense-making are properly seen as axiomatic, in that they are taken as given. Others are derived deductively. Others are propositions that have received empirical support.

The assumptions and propositions of sense-making, taken together, provide methodological guidance for framing research questions, for collecting data, and for charting analyses. Derived from these assumptions are a set of methods, particularly methods for interviewing humans about their experiences. Sometimes, therefore, one sees sense-making referred to as a theory of conducting interviews about sense-making. It is that as well.

In essence, then, the term sense-making refers to a coherent set of theoretically derived methods for studying human sense-making. The coherence is of the kind where it may be said that method is a residual of theoretic effort: it falls out from, or is a result of, the conceptual frame which defines it. This is an important point because, in fact, all method is residual of theoretic effort. The difficulty is that for most use of methods for studying human behavior, particularly human information-using behavior, the coherence among assumption, proposition, and method is hidden. Certain things are assumed to be true and entire enterprises for studying human use of information systems are derived as if no other approaches were possible. The best way to develop this point is to extract at a very high level of abstraction the assumptions and propositions which guide most research on human use of information and information systems and to contrast these with the assumptions and propositions which guide sense-making.

It is useful to start by delineating the core assumption on which sense-making rests—the assumption of discontinuity.[2] This assumption proposes that discontinuity is a fundamental aspect of reality. It is assumed that there are discontinuities in all existence—between entities (living and otherwise), between times, and between spaces. It is assumed that this discontinuity condition exists between reality and human sensors, between human sensors and the mind, between mind and tongue, between tongue and message created, between message created and channel, between human at time one and human at time two, between human one at time one and human two at time one, between human and culture, between human and institution, between institution and institution, between nation and nation, and so on. Discontinuity is an assumed constant of nature generally and the human condition specifically.

Arguments can be offered for the utility of invoking and the discontinuity assumption for many realms of study, but our concern here is its utility for the study of human use of information and information systems. Sense-making assumes that the discontinuity assumption is an important one to invoke in the study of human information use for those occasions when one wants to know about behavior that is internally controlled. One can propose many research questions that do not require the discontinuity assumption, for they pertain to questions relating to information when conceptualized as something that exists apart from human considerations. For example, if one sets standards of accuracy for answering questions at the reference desk, then one can examine how many questions are answered accurately by comparing question-in and answer-out to some externally defined standard. Or, if one wants to know what elements of a current information system's data base (collection, etc.) are used, one can examine the number of times each element is somehow activated (checked out, examined).

However, many, perhaps most, of the questions that concern us in information management, design, and practice do involve human actors. How can we design data bases so they will be maximally used? What services should we offer? How satisfied are our users? Why don't some potential users use us? How can we capitalize on the flexibilities that new technologies allow rather than merely using them, as we are, to do what we now do in greater quantities, from further distances, and at faster speeds?

What follows is a series of contrasts between the assumptions of traditional research approaches and the assumptions of sense-making, all of which are derived from the core discontinuity premise. These contrasts lay out a logic that explains why the discontinuity assumption is seen as a required assumption for much information research.

It is also important to point out at this juncture that the assumptions reviewed in this chapter pertain not just to research but also to information management, design, and practice. What sense-making has tried to do in its development over the past seventeen years is break with the undergirding assumptions that guide our current system designs which, in turn, mandate our research.

Information Use as Transmission Versus Construction

Fundamental to the specific application of sense-making to the study of human use of information and information systems is the way in which information is conceptualized. Drawing from the discontinuity assumption, information is conceptualized as that sense created at a specific moment in time-space by one or more humans. Information is not seen as something that exists apart from human behavioral activity. Because there is no direct observation of reality, all observations result from an application of energy by humans in one or more forms.

This is not to say that sense-making takes a radical constructivist (sometimes called post-modern) position, assuming that there is no order out there or that there are no tools humans can use to arrive at more comprehensive and more stable pictures of that reality. Rather, it assumes, first, that whatever order is out there is itself potentially discontinuous from time to time and space to space. It also assumes that whatever order is out there is not directly accessible by human observers whose observations are constrained by time, space, and species as well as personal capabilities. Further, it assumes that humans do not have available to them an external standard to which they can turn for an assessment of their truth, either in an absolute or even a relative sense.

The standards humans use for personal as well as collective conduct are themselves constructed and created in interaction. From a sense-making perspective, the use of a standard is itself a constructing. One human may wish to judge a moment of information use by a standard he or she calls accuracy, while another may wish to judge by expediency or familiarity or comfort. Further, the order that humans live within cannot be seen as given. It is made. Humans by continuing dialogue and sharing of personal observations do arrive at always limited but more stable observations.

What is important about this is what one proposes to study based on one or another set of assumptions about information. If one assumes that information has an existence apart from human construction, one focuses exclusively on transmission questions (e.g., How much information did someone get? Was the information they got accurate? What can we do to be sure people get more accurate information?) rather than on construction questions (e.g., What strategy did that individual apply that led him or her to call that information accurate? What strategy did he or she apply that led to rejecting information another might call accurate? How can we design systems that allow people to apply the criteria they want to their information searches?).

The point here is not to propose that there are no situations under which accuracy questions are ever relevant. Rather, it is to propose that if one assumes that information has existence apart from human observations and has the capacity to provide complete instruction (that is, continuity), then one studies human information use only in that subset of human conditions to which continuity applies.

Information Use as Seen by the Observer Versus the Actor

Directly derived from the preceding discussion is another sense-making assumption: that human use of information and information systems needs to be studied from the perspective of the actor, not from the perspective of the observer. Almost all our current research applies an observer perspective. We ask users questions which start from our worlds, not theirs: What of the things we can do would you like us to do? What of the things we now offer do you use? Do you like us? Which of the things we do do you like? Are we convenient for you? How much of what we have is good for you? Would you use this service if we provided it? Are your skills sufficient to use us? And so on.

While some of these questions are more user-oriented than others, all start with a system microscope. They are predicated on the idea that the system is the essential order and the person/user bends to it rather than the other way around. When one presents users with a long list of services and has them check off which ones they want, one has constructed a world for the users. The extrapolation from data to practice appears straightforward, but examples of the failures of information systems based on such input are legion. The difficulty is that the data tell us nothing about humans and what is real to them and do not show us how people manage to get utility out of systems which systems do not even predict, or how what looks like a failure from the system's perspective is actually a success when seen from the human's eye. The data do not help us understand why a service people said they wanted goes unused, or why as communication technologies spread we appear to be creating a more demarcated world of communication haves and have-nots. The data do not tell us where we might move our systems if we are really to serve people on their terms.

Information Use as State Condition Versus Process Condition

Sense-making focuses on behavior. As such, it assumes that the important things that can be learned about human use of information and information systems must be conceptualized as behaviors: the step-takings that human beings undertake to construct sense of their worlds. These step-takings, or communicatings, involve both internal behaviors (comparings, categorizings, likings, dislikings, polarizings, stereotypings, etc.) and external behaviors (shoutings, ignorings, agreeings, disagreeings, attendings, listenings, etc.).

While almost all social science-guided research now professes a belief in the power of process views of human behavior, in fact little research implements such a view. Usually the focus is on states and entities rather than processes and behavioral strategies and tactics. For example, the typical study will ask who uses an information system and formulate an answer in terms of who the user is, what the user has access to, how connected the user is to other users, what skills the user has, and so on. The typical study does not ask what constructed views lead a person to reach out to an information system. In fact, the constructed view is assumed as a constant—a state of information need. The qualities of this state of need are not explored because they are actually assumed not to exist. In a monolithic view of information use as transmission, the state of need is necessarily assumed also to exist monolithically.

The use of state assumptions has numerous consequences for the conduct of research. Typically, for example, information research attempts to predict and explain human use of information and systems based on across-time-space formulations rather than time-space-bound formulations. We focus, for example, on levels of analysis (e.g., interpersonal information exchanges versus mass media information exchanges) as if they ought to explain differences in behavior. Or, we assume that topical contexts as we define them ought to explain the difference (e.g., health information versus political information versus science information). Or, we focus on across-time-space characteristics of the person (e.g., demography, personality, skills, resources) as if they ought to explain behavior. In fact, all of these explain very little.

The use of state assumptions has had enormous consequences even for what we think is possible in understanding human information use. It has frequently been charged, for example, that individual behavior vis-à-vis information is too chaotic to expect much from systematic study. Proof here is the frequently low variances accounted for in attempts to predict anything more complicated than habitual patterns of channel use. A result of this assumed chaos is that we find voices calling for two radically different kinds of retreat: one is the retreat to qualitative and highly contextualized understandings of individuals; the other is the retreat from individual to structural understandings.

It is not the purpose of this chapter to suggest that qualitative approaches or structural understandings are not useful. Rather, what is being suggested is that these responses, when framed as ways of handling the chaos of individuality, are consequences of the application of state assumptions. If human information use can best be understood using process assumptions, then attempts to do so using state or entity assumptions will yield limited results. These limited results will suggest that individual behavior is at worst chaotic

and at best capricious and recalcitrant. In fact, though, it may be quite systematic if studied from a process perspective.

The difficulty we have is a lack of examples that allow us to envision the possibility. Sense-making assumes that there is something systematic about individual behavior when the individual is reconceptualized not as an entity but as an entity behaving at a moment in time-space. It is assumed that the individual constructs ideas of these moments, that these constructings are themselves strategies, that these constructings are sometimes repetitions of ideas used in the past and sometimes newly created because of how the individual defines the new situation. It is further assumed that the individual will implement his or her pictures using behavioral tactics which are responsive to the individual's ideas of the situation. Some of these tactics will again be repetitions of past behaviors, given the rule-based characteristics of much of human behavior. Which tactic is used has consequences for the kind of idea created; the kind of idea created has implications for which tactic is used.

This formulation leads to a proposition which states that individual use of information and information systems is responsive to situational conditions as defined by that individual. In essence, the individual defines and attempts to bridge discontinuities or gaps. It is this focus on gap-defining and gap-bridging which is seen as offering a way of introducing order to conceptualizations of individual behavior. It is not the individual entity that is seen as ordered but rather the gap-defining and gap-bridging that is ordered.

What is proposed here is the idea that the essence of the communicating moment is best addressed by focusing on how the actor in the moment defined that moment and attempted to bridge that moment when conceptualized in gap terms. It is assumed that the "gap" idea gets to the essence of the communicating moment both in terms of describing and explaining that moment as seen by the actor and in terms of predicting the behavior of that actor in that moment.

At a specific moment in time-space, therefore, an individual who defines self as facing a gap of a particular kind may use communicating tactics of a particular kind. In a different moment, facing a different gap, he or she may use a different tactic. He or she may, in fact, be very rigid, but the rigidity may be of the kind which says "given this gap, then this tactic." Or the individual may be very flexible—or perhaps entirely capricious. The point, though, is that by focusing on the gap-defining and gap-bridging we allow to emerge for examination human flexibilities and rigidities and allow the possibility that both are amenable to systematic analysis.

Sense-making, thus, sets forth the gap idea as a theoretic assumption and as a guiding frame for method: methods of framing questions, methods of interviewing, and methods of analysis. It is proposed that focusing on the gap idea moves research toward a new kind of generalizability, at a more abstract, more fundamental, and more powerful level applicable across situations but at the same time more pertinent and more relevant to specific moments in time-space.

In proposing that by assuming across-time-space constancy we have missed time-space-bound constancy, it is not suggested that there are no across-time-space rigidities or patterns in human use of information and systems. Sense-making assumes that humans are to varying extents under varying conditions responsive to external constraints on their behavior. Given the law of least effort, for example, we would expect humans to repeat applications

of past strategies and tactics to new moments in time-space if these new moments are themselves seen as repetitions of the past. However, since much of human life is inherently unpredictable, much of human behavior involves creating new responses. However, external conditions such as economic class, income, and education are illustrative of the kind of structural constraints which delimit the creating of new responses. To the extent that these external conditions are perceived as operating, we would expect to find constancies across time-space in human behavior. It would be expected, therefore, to find constancies in use of channels (e.g., how much a person uses a library or even reads a particular class of book) more than constancies in use of information (e.g., what a person does with what he or she reads).

An important aspect of this formulation is the idea that communicating behaviors are the link between individuals and structures, institutions, and cultures. While current contexts in the social sciences seem to pit individual against structure and conceptualize the structure as an across-time-space entity that persists despite individuals, in fact they are part of a whole. It is a whole that persists despite individuals, in part because just as we have assumed that we have often missed, in part because just as we have assumed that information-sharing could be conceptualized as transmission or transfer, we have assumed that the relationship between structure and person could be conceptualized as transmission or transfer. Anthropological terms such as "acculturation" arise from such a formulation.

Sense-making does assume that the individual is situated at cultural/historical moments in time-space and that culture, history, and institutions define much of the world within which the individual lives. Nevertheless, sense-making also assumes that the individual's relationship to these moments and the structures that define them is always a matter of self-construction, no matter how nonindividualistic the person or the time-space may seem. Structure is energized by, maintained, riefied, changed, and created by individual acts of communicating. Because we have sought only across-time-space understandings, we have missed much of the whole range of human existence that involves struggling with, breaking with, coming to terms with, and changing whatever structure humans find themselves in.

In essence, we have done better at developing understandings of human rigidities than of human creativities. One reason for proposing the use of discontinuity assumptions in the study of human use of information and information systems is that it is in the realm of information behavior that we ought to find humans at their most creative, least constrained by external forces, because so much of individual information use is private.

THE METHODOLOGY AND ITS METHODS

In the most general sense, the methodological approach that is called sense-making is an approach to studying the constructing that humans do to make sense of their experiences. For our purposes in this chapter, the experiences we want to study are experiences relevant to information and communication system design, management, and practice.

There is no direct way we can point to standard genres in the literature and say that this is the focus of sense-making. It is true that the approach has been used to construct studies of aspects of experience which systems (and the

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researchers hired by these systems) call information need, satisfaction, or image studies. What this means is that sense-making has been used to study human sense-making in situations where humans reached out for something they called information, used something they saw as a potential source and judged whether it helped or not, or created an idea about an institution based on experience with the institution.

Sense-making is seen, thus, as a generalizable methodology developed for the study of all situations that involve communicating. It is implemented in all studies with a simple operational metaphor, derived directly from the discontinuity or gap idea pictured in figure 6.1. While it can be applied to entities other than individual human entities (e.g., collectivities), it will for purposes here be applied to individual behavior.

QUESTIONS ANSWERED
IDEAS FORMED
RESOURCES OBTAINED

GAP BRIDGED

USES (HELPS)

SITUATION

GAP FACED
(BLOCK FACED)
(BARRIER FACED)

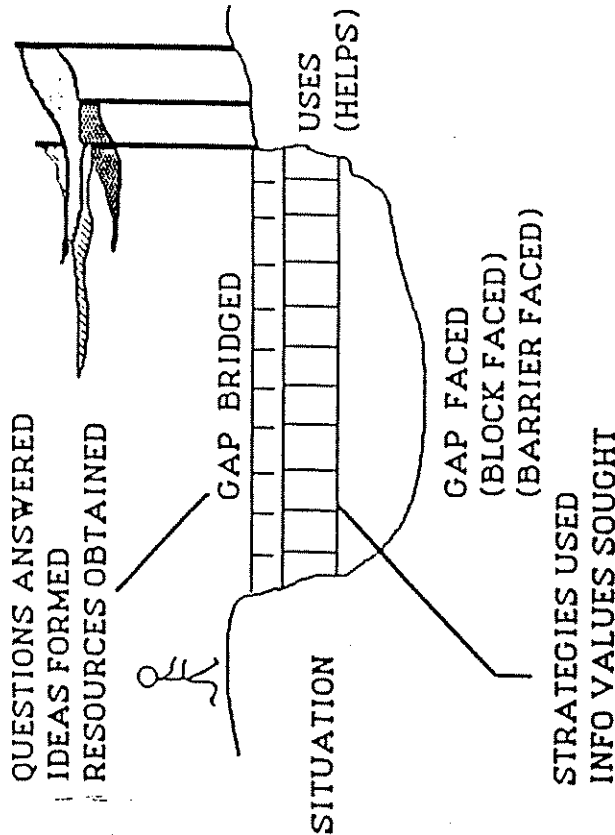STRATEGIES USED
INFO VALUES SOUGHT

Fig. 6.1. The sense-making metaphor.

Assume a human being taking steps through experiences: each moment, a new step. The step may be a repetition of past behavior, but it is always theoretically a new step because it occurs at a new moment in time-space. Assume a moment of discontinuity in which step-taking turns from free-flowing journey to stop. Focus on the individual at this moment of discontinuity, this stop which does not permit the individual, in his or her own perception, to move forward without constructing a new or changed sense. Determine how the individual interprets and bridges this moment: what strategy

he or she used to define the situation which was the gap; how he or she conceptualized the discontinuity as gap and the bridge across it; how he or she moved tactically to bridge the gap; how he or she proceeded with the journey after crossing the bridge.

This metaphor constructs the sense-making triangle of situation-gap-help/use, pictured in figure 6.2. As an individual moves through an experience, each moment is potentially a sense-making moment. The essence
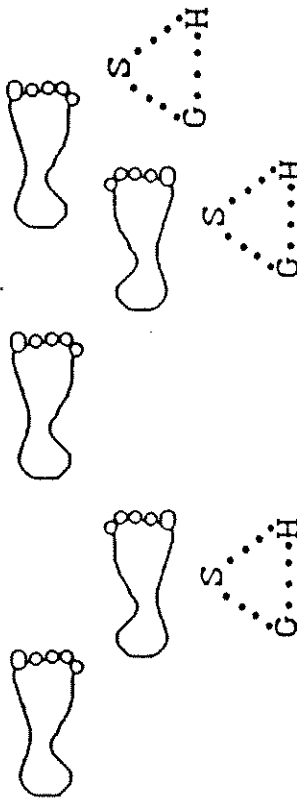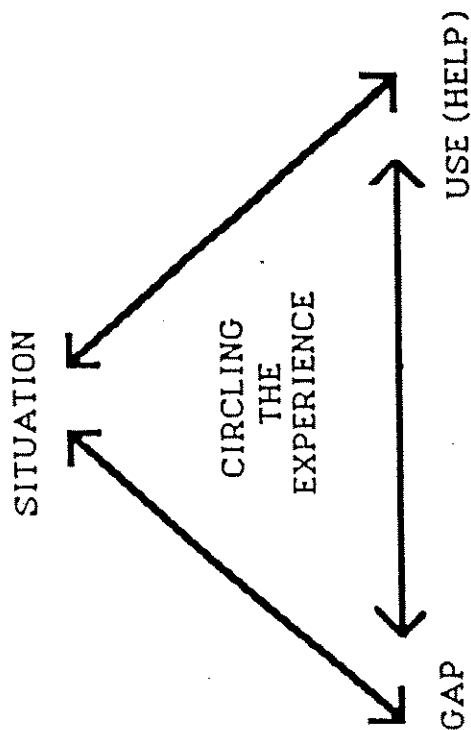

SITUATION

USE (HELP)

CIRCLING
THE
EXPERIENCE

GAP

Fig. 6.2. The sense-making triangle.

THE EVENTS   **THE GAPS**   **THE HELPS**

THE EVENTS	THE GAPS	THE HELPS
I was writing a proposal for a Federal Grant and needed to know what the overhead was.	Why isn't there a data base with these in it?	Save time...save hassle.
I called my administrator and she gave a figure.		
I wrote the proposal but when I turned it in to my boss he said the figure was wrong.	How much time is this going to take?	Know how to plan my schedule.
	How come they never have the same facts?	Understand and be able to deal with them better.
He gave me another figure but when I checked with yet another office I got a third figure.	How will my boss take this?	Avoid his wrath. He doesn't like to be wrong.
	Why isn't there a data base with up-to-date info?	If it existed, I'd know someone listened!
I called a total of 10 offices and finally figured out the mess.	Why do these rates change so often?	So I could understand why this took so long.
	Why are so many exceptions made?	So I would know how to be an exception too.
I lost 2 full days working time.	Why isn't an exception made for me?	Wouldn't help...I'd probably feel worse.
	Why isn't there a data base with this in it?	If it existed, IT WOULD SAVE TIME!

Fig. 6.3. An example of a micro-moment time-line interview.

of that sense-making moment is assumed to be addressed by focusing on how the actor defined and dealt with the situation, the gap, the bridge, and the continuation of the journey after crossing the bridge.

The metaphor is a highly abstract one seen as applying at all levels (intra-personal, interpersonal, small group, organizational, mass, telecommu-nication, database, societal) of information use and information-seeking and in all contexts (health, political, scientific, instructional, etc.). It directs attention to the steps the actor takes as defined on the actor's own terms to address the gaps he or she faces as defined on his or her own terms. It is not intended to suggest that all situation-facing is linear or purposive. When seen from the actor's perspective, time can be constructed in a variety of ways, linear, cyclically, and otherwise. Also, situation-facing may or may not be goal-oriented in the usual sense. Sense-making assumes that there is always a mandate to cope with self even if the purpose in the situation is defined by the individual as forgetting self or losing control of self. Nor does the method enforce any idea of correct divisions of situations into moments. Given the dis-continuity assumption, the moments are seen as vehicles for examining gap-defining and gap-bridging, not representations of reality as it is.

As was noted previously, the sense-making approach is applied through-out the research process in framing questions, in collecting data, and in analyzing data. All of these are part and parcel of the same holistic process. Sense-making methods show most clearly in collecting data, so this will be the focus of this section. The approaches impact on the framing of research questions, as was illustrated in this chapter's first section; the impact on the analysis of data is illustrated in the third section.

Sense-making provides a theory of how to conduct interviews with respondents. It is seen as applicable both to formalized and extended inter-views in research studies as well as to less formalized and often briefer interviews during which the institution interacts with its users or potential users to provide service. Both of these interview situations are seen as requiring implementation based on gap assumptions. Our focus in this section is on research interviews.

Showing the variety of sense-making interviewing methods requires that we start with the core method, the one which is most clearly theoretically derived and most isomorphic with the sense-making assumptions. This is called the micro-moment time-line interview. An example of such an interview is presented in figure 6.3. In the micro-moment interview, the respondent is asked to reconstruct a situation in terms of what happened in the situation (the time-line steps). The respondent is then asked to describe each step in detail. The core focus of the description is directed to the sense-making triangle, circling the micro-moment in terms of how the actor saw the situation, the gap, and the help he or she wanted—that is, where he or she wanted to land after crossing the bridge. What additional elements are examined and what elements are stressed depend on research purposes.

In studies of *information needs*, emphasis has been placed on understanding how the individual saw self as stopped, what questions or confusions he or she defined, what strategies he or she preferred for arriving at answers, what success he or she had in arriving at answers, how he or she was helped by answers (how he or she put the answers to use), and what barriers he or she saw standing in the way to arriving at answers. The situations or experiences which have been the foci of interviews directed at needs assessment
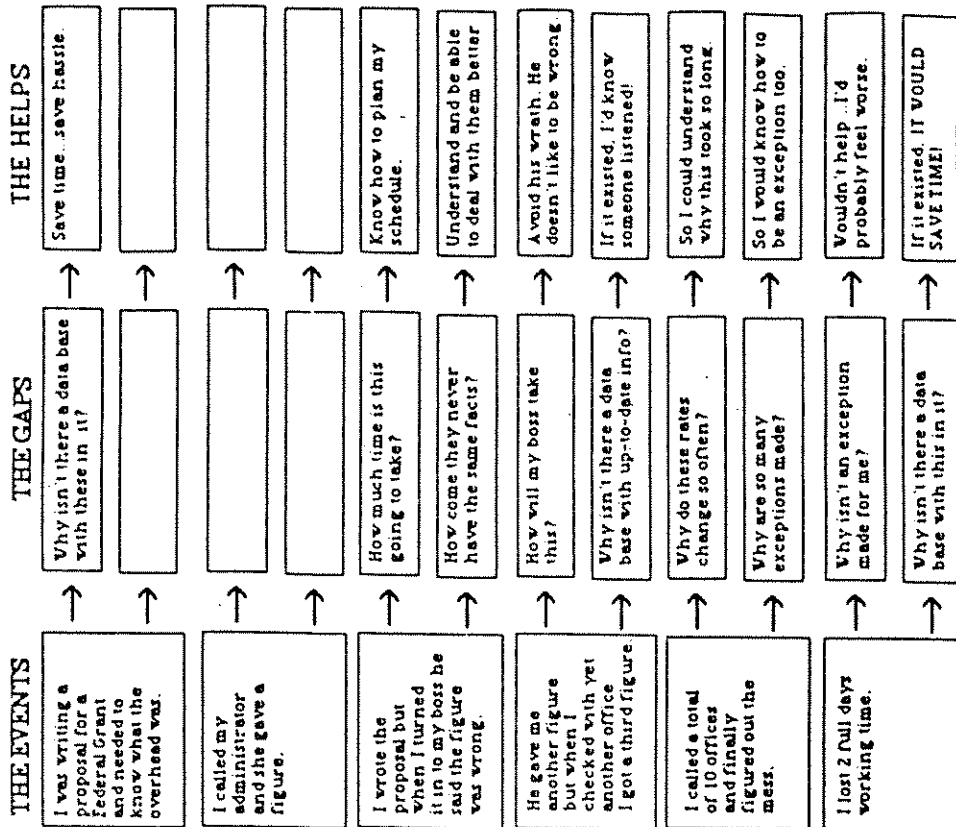
have been ones pertinent to the service mandate of the institution. In a study for a public library, for example, the situations involved all everyday-need experiences, situations in which the actor needed an answer to one or more questions, for example. In a study for a blood center, the situations involved each donor's last experience with donating. In a study of cancer patients, the situations involved each patient's most difficult treatment session. In a study

of users of television programming guides, the situations involved each viewer's last use of such a guide.[3]

In contrast, studies of *satisfactions* with an institution have focused on descriptions of the actor's last (in other studies, worst, best, most memorable, and so on) use of the institution from the time when the possibility of use came to mind. Again, time-line interviews focus at each step on the sense-making triangle. A satisfaction study focuses more emphasis, however, on what helps actors sought and what ones they found, what barriers they saw standing in the way, what they saw as causing barriers, what barriers they got around, and the ways the institution or its representatives helped in this process. Again, situations which are the focus of the interview are selected to fit research purposes. In studies for public libraries, for example, situations have focused on the user's last use, worst use, or most remembered use. In a study for an archdiocese, respondents were asked to recollect situations in which they were helped by the church and situations in which they were hindered by the church.[4]

As a third example, studies of *images* of institutions have examined the most recent situation in which the institution was in the actor's consciousness via contact, conversation, media, or simply memory. Again, the sense-making triangle is used to focus attention, with special emphasis placed on what ideas the actor saw self as having as a result of this most recent situation of consciousness and what impacts these ideas had on his or her behavior (that is, how she or he made the ideas useful).[5]

In each of these research genres, sense-making is focused on different elements, depending on the research purpose. For each of them, the respondent is asked to reconstruct different situations, again depending on the purpose. What is common to all, however, is that the respondent is focused on real experiences. While these experiences can be infinitely variable across respondents, they are given systematic order because recollections are guided in terms of the sense-making metaphor and focused on gap-defining and gap-bridging.

A number of derivative interviewing methods have been developed to suit different purposes. One of these is the abbreviated time-line interview, in which respondents are asked to focus on only one (e.g., the worst, the best, the most important, the most troublesome) step, question, help, or barrier. This interviewing method is useful particularly in research situations involving routine or habitual behavior, where the depth and detail of the micro-moment interview would be unwarranted.

Another approach, called the *help chain*, focuses in particular on how the respondent constructs the connection between information, system, or structure and self. Here the respondent is asked to chain his or her answers to the query: How did (the library, the book, the database, the article, etc.) help you? The chaining involves repeated queries to the respondent of the type "And, how did that help you?" until the respondent feels the statement of help has been made in the most personal and life-relevant terms.

Another approach is message/q-ing in which the intent is to utilize respondent sense-making to understand and/or improve specific messages, such as software manuals. Here the respondent is asked to focus on elements of a message which involved gap-defining and/or gap-bridging in some way. The element may have led the respondent to have an idea, or face a confusion, and so on.

These four examples of interviewing approaches do not constitute all the approaches developed to date. They do provide the major examples, however. An important element in all of them is that the respondent is conceptualized as a colleague. No element of the study purpose is hidden in any way. Frequently, respondents are involved in a quite lengthy process during which they are taught many aspects of the interviewing approach so they can control the pace of the interview itself. At first, some respondents and some interviewers balk at the approach. Interviewers balk because they want to be more directive and need assistance in learning how to redirect the respondents to the sense-making metaphor and how to assist the respondents in reconstructing their sense-makings. Respondents, on the other hand, need assistance in learning how to present all the personally important details that they wish while at the same time utilizing the interview structure. The relationship is presented as a quid pro quo and results to date suggest that the large majority of respondents accepts it as such. Using the approach, studies have successfully utilized telephone interviews which lasted well beyond the accepted fifteen-to-twenty minute average which survey researchers say is the maximum tolerated time. In many studies, respondents have volunteered to be interviewed again. Results suggest that there is, when sense-making interviews are at their best, a consciousness-raising and therapeutic value in the process for respondents.

EXEMPLARS

Exemplar studies were selected for presentation here to illustrate important elements in the preceding discussions. Exemplars are used to illustrate the genres of research to which sense-making has been applied, namely studies of information needs, images, and satisfactions. Exemplars are also used to demonstrate the use of sense-making in descriptive work, in system design, and in hypothesis-testing work. In addition, these exemplars show the use of the approach to yield data that are dealt with primarily in what has been traditionally called qualitative terms (e.g., as case studies) as well as to yield data which were then further analyzed via content analytic and other tools to yield systematic results. Further, although it is a rare application, the exemplars present studies which have been primarily close-ended, asking respondents to describe which of a series of gap-bridging and gap-defining categories describes their situations best.

Any given study can serve more than one exemplar function, of course, so the selected studies follow one after the other, with each described in terms of the different ways in which it illuminates the points previously listed. Six studies in all are described from the set of forty or more studies done to date.

Exemplar One

In a study for the California State Library, the research purpose was to identify the "information needs" of Californians and to elaborate ways libraries could usefully help with these needs.[6] Black, Asian, Hispanic, and Anglo individuals were asked to describe step-by-step what happened to them in the most important recent troublesome situation they faced. For each step,

they were then asked to indicate what questions they had. They were further asked to select the most important question they had and, for this question, to indicate whether they got an answer and how the answer helped. Each of these elements was seen as the implementing of communicatings by the individual — definings of gaps and actings to face "gappiness." Here are excerpts from a sample interview of an eighteen-year-old female:

The time-line

Step 1: *I quit school because I got pregnant.*

Step 2: *I had the baby one month ago.*

Step 3: *I didn't know whether to go back to school or not.*

Step 4: *I am only 18 and my folks thought it was important.*

Step 5: *I live at home so I have no expenses and my mother babysits for me.*

Step 6: *So I am going back to school.*

Questions asked

At step 3: *How important is returning to school?*

At step 4: *How much do I really want to go back?*

Analysis of most important question (question at step 3)

How got answer: *My own thinking and parent's advice.*

How did answer help: *Made me feel better about me. Got me started going back to school.*

The study classified, using content analysis, ways in which individuals conceptualized themselves as stopped or hindered in these situations and hypothesized that these conceptualizations would be a better predictor of information seeking (question asking) and using (how the individual applied answers to gaps, that is, how they were helped) than race. Thus, for example, it was assumed that two individuals, one white, one black, both of whom saw themselves as being dragged down roads not of their own choosing, would be like each other communicatively at that moment. They contrasted with two individuals, both black, one of whom saw self as being dragged down a road not of his or her own choosing and the other of whom saw self as faced with a host of alternative roads from which to choose. The hypothesis was confirmed.

Some kinds of communicating are highly constrained by the kind of socioeconomic forces for which race is constructed as a descriptor of human entities. It was found that while race did not predict information-seeking in terms of questions asked, it did predict, in interaction with gap-definings, what channels or sources individuals used to get answers.

In addition to the data used for hypothesis testing, results of this study provided a large amount of descriptive data regarding the nature of need

situations, the kind of questions people had, the barriers they saw to question-answering, the strategies they used to get answers, the success they had with different strategies, the helps they wanted from answers, and the barriers they saw as standing between them and getting help. Essentially the same approach to information needs assessment has been applied in a wide variety of contexts, for example, with Hmong refugees regarding their health information needs, with cancer patients regarding their information needs while undergoing treatment, and with blood donors regarding their information needs pertaining to donating blood.

When researchers are interested in quantification of their qualitative results, each specific study context can involve its own detailed set of content analytic categories. Blood donors often ask, "Will I faint?" Cancer patients ask, "Will I die?" Citizens facing everyday situations ask, "How long will it take me to handle this?" Much of the quantitative work of sense-making studies, to date, has also focused on developing generic categories to describe needs, barriers, and helps wanted—categories which are universal in the sense that they pertain to gap-bridging and gap-defining across situations while at the same time they capture important aspects of particular situations.

Across studies, these category schemes have stabilized. Several examples will be given here. To capture the ways in which humans see their journeys blocked, a set of categories has been developed under the label *situation stops*. Among the categories in this schema are these stops: the decision stop, where the human sees two or more roads ahead; the barrier stop, where the human sees one road ahead but something or someone stands on the road blocking the way; the spin-out stop, where the human sees self as having no road; the wash-out stop, where the human sees self as on a road that suddenly disappears; the problematic stop, where the human sees self as being dragged down a road not of his or her own choosing.

To capture the questions people ask in situations in terms of universal gap-definings, these categories have been developed to capture human attempts to bridge gaps relating to characteristics of self, characteristics of others, characteristics of objects or events, the reasons or causes of events, the consequences of actions or events, and the connections between things. The foci of these questions change depending on whether individuals are defining gaps they see in the past, present, or future.

To capture the ways in which people put answers to use, these *help* categories have been developed: creating ideas, finding directions or ways to move, acquiring skills, getting support or confirmation, getting motivated, getting connected to others, calming down or relaxing, getting pleasure or happiness, and reaching goals.

These three examples illustrate content analysis schemes that have been developed across a series of studies to capture the gap-defining and gap-bridging aspects of situation-facing. Sense-making theory leads to predictions, for example, that the ways in which people see their gaps will be related to the ways in which they try to bridge them and not to characteristics of persons independent of the gaps. Results to date confirm this prediction. Such findings are seen as potentially applicable to system design not only in terms of how practitioners interact with users to determine their needs but also in terms of actual elements of the design of information storage and retrieval systems. For example, a portrait of how a book was seen as helpful to the past ten readers may be a more useful retrieval device for the next reader than traditional

categories An information agency should have better success in educating its mandated public if it gives the public control of the entry point to the information exchange. This becomes possible if the users can enter the system in terms of the questions they have.

Exemplar Two

In a study of information-seeking by blood donors, donors were asked to describe their donating situations in terms of what happened, what questions they had during the process, and how they hoped answers to their questions would help them. Again, responses from the donors were conceptualized as strategies of gap-defining and tactics of gap-facing. Excerpts from a sample interview follow.

The time-line and questions at each step

Step 1: *We were told we could get extra credit in health class for donating.*

    Q1: *How much did I have to give?*

    Q2: *What are the procedures?*

Step 2: *A friend who had donated told me about it so a friend and I decided to donate.*

    Q1: *How long would it take?*

    Q2: *Would it hurt?*

    Q3: *How big is the needle?*

    Q4: *How much blood do I have to give?*

(Skipping down to step 7)

Step 7: *The nurse called me in and I didn't know what was going on.*

    Q1: *What are they going to do?*

    Q2: *What is all this equipment for if they are just going to take my blood?*

(Skipping down to last step, 11)

Step 11: *After eight minutes I went to the canteen for cookies and juice.*

In-depth analysis of Q2, step 7

How easy was it to get an answer to this question? *1* (on a 1-10 scale)

Did you ever get an answer to this question? *No.*

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Why? *Because they didn't tell me anything. They just did it.*

How would the answer have helped? *I wouldn't have been scared or in suspense wondering what they were going to do.*

A battery of different predictors were compared in terms of their power to predict how donors wanted to be helped by information: across-time-space measures (e.g., demography), a priori time-space measures (e.g., interests and focus of attention at the moment of entering the donating situation), and time-space-bound measures (e.g., how the donors defined their gaps and how they acted to face them). Results showed that across-time-space and a priori time-space measures accounted for an average of only 3 percent of the variance in several criterion measures tapping how donors wanted information to help. In contrast, time-space-bound measures accounted for an average of 17 percent.

Detailed qualitative analysis of the primary statistical patterns showed that each step in the donating process had its own characteristic pattern of information-seeking and -using. Based on these results, a design was constructed to provide a user-friendly computerized question-answering system at five different points during the donating process. Typical questions at each point were to be displayed on the screen of a terminal. Donors would simply touch the question of interest to them and they could then choose from a variety of question-answering strategies. For example, two donors, each asking the same question—"Will I faint?"—could choose to select answers from doctors, or other donors, or statistical counts, or any combination.

Exemplar Three

A public library with a large number of Hispanic citizens on its mandated patron roster searched for ways to entice the Hispanics into the library.[8] Previously, a number of study approaches were tested and met with hostility. The traditional methods of publicity had failed. The sense-making project focused on users of the library's audiovisual services and serendipitously provided a breakthrough for serving the Hispanic community. One study asked thirty randomly selected recent users what happened that brought them to the library, what they got while there, and how they were helped. A second study asked sixty-four randomly selected borrowers of library videotapes how the specific videotapes they used helped them. Here are excerpts from two examples from the second study:

Example #1

What was the title of the videotape borrowed? *Ghandi.*

How did the video help? *It helped me set some positive goals and not give up until we succeed.*

Example #2

What was the title of the videotape borrowed? *Rumpelstiltskin.*

How did the video help? *This movie let me sit down and watch television with my children. It was a movie they picked. They decided on the movie and the time for themselves. The movie makes my children ask questions about what is real.*

Librarians reported that for the first time they had conducted interviews with Hispanic patrons and not been met with hostility. They learned that their videotape checkout service was providing these patrons with important helps. Further, the videotapes pointed to a link for these patrons with other library services—literacy training, for example, and how-to-do-it books. One librarian summed it up: "It helped us see patrons from a different point of view, to understand them better, and to be better able to tolerate the crowds around the audio-visual desk." The library staff decided to move funds from other services to video services.

Exemplar Four

In a study of images of an institution, a random sample of 1,006 residents of a city were asked about their last contact with that institution and what that contact involved.[9] They were asked what ideas that contact led them to have and what impact they saw each idea as having on their thinking about, talking about, and relating to the institution. The study was an attempt to understand public images regarding the institution and the effects interactions with and/or awareness of the institution had. All elements—situation definitions, images, and effects—were conceptualized in consonance with the sense-making formulation as *hows,* the hows of situation-defining and gap-facing. Two sample interviews follow.

Example #1

Nature of last contact: *I passed the building when I was downtown.*

Idea that resulted from this contact: *How come they get to have such a big building?*

Impact from this idea: *I think of them as not being good members of the community. I wouldn't be lenient with them in a pinch.*

Example #2

Nature of last contact: *I talked to someone who worked there.*

Idea that resulted from this contact: *They treat the people who work there badly.*

Impact from this idea: *I don't want to use their service or have any contact with them.*

A comparison of what best predicted images and effects showed that situation was far more powerful as a predictor than demography. Thus, for example, (two citizens, one old and one young, both of whom had contact involving interpersonal interactions with employees who worked at the institution, were likely to share the same ideas about the institution and to see themselves as affected by these ideas in the same way.

For this particular institution, results showed that citizens whose last contact with the institution involved coming to the idea that the institution treated its employees badly were significantly more likely to report that they were explicitly avoiding use of the institution as a result. The results pointed, therefore, to specific changes the institution had to make in itself if it were to change its image.

Exemplar Five

College students' information-seeking and use in a series of twelve different situations was compared.[10] The situations were created by pitting three situational dimensions against each other. One dimension focused on how the individual defined his or her status in the situation (low or high). A second focused on how the individual defined the openness of communication in the situation (open or closed). A third focused on how the individual saw self as stopped: as having to choose between two or more roads seen ahead, as having to cope with being dragged down a road not of his or her own choosing, or as having to follow another more experienced person down the road.

Each person was asked to recall a time when he or she was in a situation of each type: for example, where he or she had low status, was making a decision, and communication was open; or a time when he or she had low status, was making a decision, but communication was closed. In this way, all individuals were asked to report on twelve situations and, for each, were asked to indicate what questions they had in the situations and what ways they wanted to be helped.

Again, all elements were conceptualized as communicating strategies and tactics. A predictive analysis showed that situational measures predicted information-seeking and use. The important finding was that neither demography nor the individual as state entity did so. No statistically significant consistency was found in information-seeking and use in terms of individual behavior across the twelve situations. Rather, how the individual defined the situation predicted how the individual faced it, thus supporting a hypothesis derived from sense-making theory.

Exemplar Six

In a study of southeast Asian refugee health information needs,[11] intact groups of southeast Asians were interviewed in bilingual settings using the sense-making format. Respondents were allowed to talk in their native language or in English, as they wished. The group facilitator translated. The refugees were asked to recall their recent visits to a hospital or clinic, to describe the events, and for each event describe the questions they had,

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whether they got answers, and how. Here are the results of the interview with one respondent, a thirty-five-year-old female whose first visit to a United States hospital was to have a baby.

Situation 1: *The last time I went to the hospital is I have my baby and then after I have my baby the doctor and nurse bring me cold water. So that in my culture that's different and I keep asking them about the question: Why the people that has new baby they keep drinking very cold water?*

Situation 2: *After I have my baby, I am very new, my body is changing and they let me take a walk every two hours or three hours. I keeping thinking that my body is new and that I'm so tired so that they're doing these things and it's so hard for me to understand. And also I think that many things in my body is not wrong and there is no illness but I just have a baby and I am thinking that in a few days I'll get better. I'll get strong but the doctor say you have to walk and I was thinking: Why he say this?*

Case-study results of the project were useful in helping medical practitioners serving the new refugees answer their patients' questions about medical services. Alternatively, they were useful in tempering and changing medical practitioner demands on the new patients.

CONCLUSIONS

The six exemplars just presented are only a few of more than forty different sense-making studies conducted to date. Studies have been conducted with a wide variety of populations (e.g., preschool children, teenagers, doctoral students, developmentally disabled adults) pertaining to their information needs in a wide variety of situations (e.g., health, environment, politics, science, child care, education, finances, leisure time, everyday life, job) and their interactions with a wide variety of communication systems (e.g., libraries, databases, media, books, newspapers, software manuals) for a wide variety of institutions (e.g., California State Library, National Cancer Institute, Ohio Department of Health).

The intent here has been to present a representative sampling of a methodological approach which has been widely applied to research questions relating to human use of information and information systems but which is itself conceptualized as a generalized methodological approach for the study of any situation in which one wishes to focus on how people construct sense of their experiences.

Having presented the preceding discussion and exemplars, it is now possible to address the aspect of sense-making which brings it into this volume—the qualitative nature of the approach. The issue of quantitative versus qualitative approaches to the study of human behavior is one of a set of interrelated issues which have come to be known as the ferment in the social sciences, or the paradigm crisis.[12] These include, among others, the issues of theoretic versus applied research, individualistic versus structural research,

and administrative (serving established institutions) versus critical (criticizing institutions) research, as well as qualitative versus quantitative.

The presence of "versus" in these ferment descriptions generally implies that the researcher must choose between one or the other: theoretic or applied, individualistic or structural, administrative or critical. Although the arguments cannot be fully developed in this chapter, sense-making as an approach has explicitly cast itself in the middle as all of the above. It is theoretic because it sets out to test hypothetical propositions and is itself based on a coherent set of theoretic premises and assumptions. It is applied because the work is directly applicable to information system management, design, and practice. In fact, in its focus on communicating behaviors, sense-making sets out explicitly to develop theoretic understanding directly useful to practice; to be, in effect, a theory of practice. Sense-making is individualistic in its focus because it acknowledges that individual humans are the carriers of communicative action, the acts by which meaning is made and systems are energized. But it is also structural, because it acknowledges that individuals live in and embody structures and have varying degrees of consciousness of this. The approach is administrative, in that it sets out to improve systems, and critical because it serves as a vehicle for the users of those systems to speak to those systems on their own terms. In essence, the approach attempts to provide a vehicle for giving voices to users and potential users of systems so that the systems can be responsive to them.

In the argument between qualitative and quantitative approaches to research, sense-making likewise refuses to choose a side. It is explicitly both qualitative and quantitative. Even more important, sense-making does not see any of these choices (e.g., qualitative versus quantitative, administrative versus critical) as legitimate or binding choices, but rather as polarizations that have at least in part resulted from specious understandings of the nature of research growing out of the application of weak and limiting assumptions of the nature of human information behaviors.

To illustrate this argument, return to the idea that the behavior of individuals can look chaotic if one keeps looking for constancy in the wrong place, as carried by entity rather than by process. Given an assumed chaotic individuality, it becomes rather easy to frame qualitative research approaches, particularly those forms of qualitative research which are proposed as having to be systematically unsystematic, as the necessary response. Sense-making on the other hand, assumes that there is something systematic about individual behavior to be found by pursuing process orientations. In this way, then, sense-making casts itself as systematic qualitative research, an approach with qualitative sensitivity which is amenable to the systematic power of quantitative analysis.

To understand this more fully, it is necessary to examine the several meanings of the word *qualitative* which apply to sense-making. One of these is fundamental to the theory of sense-making: the assumption that human use of information and information systems *is* qualitative, not monolithic. This implements the discontinuity assumption. Information is not seen as something that describes a given reality in an absolute and potentially accurate way, which can't be transmitted from source to receiver through channels, which can be counted by external standards and pigeon-holed for all time. Rather, information is constructed. The act of constructing and the act of using that which is constructed is a qualitative act. It varies in kinds.

Sense-making assumes that the essential aspects of information use can be captured by looking at qualities of gap-defining and gap-bridging. A person in a moment defines that moment as a particular kind of gap, constructs a particular strategy for facing the moment, and implements that strategy with a particular tactic. Gap-defining and gap-bridging become, therefore, the essential qualitative aspects to be examined.

A second way in which sense-making is qualitative is that its implementation in method is at least in part what we usually term qualitative. This is a given based on the assumption, set forth earlier, that method is residual of theoretic assumption. Sense-making methods, therefore, yield data which are identifiable as qualitative. It consists of open-ended responses to questions, for example, and can be constructed as case studies, records, or interactions with messages, and so on. In the few studies which have been entirely close-ended, the close-endedness has involved respondent assessments of qualities of gap-defining and gap-bridging.

What is different about sense-making, however, is that the qualitative data-collection and analysis methods are all guided by the same general theory of what it is appropriate to capture in these qualitative analyses. This theory introduces, therefore, a means of systematization across qualitative analyses.

NOTES

1 References to sense-making studies are incorporated throughout this chapter. For the most recent published pieces, see Brenda Dervin, "Audience as Listener and Learner, Teacher and Confidant: The Sense-Making Approach," in Public Communication Campaigns, 2d ed., eds. Ronald Rice and Charles Atkins, (Newbury Park, Calif.: Sage, 1989), 67-86; Brenda Dervin, "Users as Research Inventions: How Research Categories Perpetuate Inequities," Journal of Communication 39, no. 3 (Summer 1989), 216-32; Brenda Dervin and Michael Nilan, "Information Needs and Uses," Annual Review of Information Science and Technology 21 (1986): 3-33. The most comprehensive description to date is available from the author: Brenda Dervin, "An Overview of Sense-Making Research: Concepts, Methods, and Results to Date" (Paper presented to the International Communication Association, Dallas, May 1983).

2 Sense-making as an approach rests heavily on the work of Richard Carter. See, in particular, Richard F. Carter, "What Does a Gap Imply?" (Paper presented to the International Communication Association, San Francisco, May 1989); Richard F. Carter, "Discontinuity and Communication" (Paper presented at East-West Center Conference on Communication Theory East and West, Honolulu, November 1980); Richard F. Carter, "Toward More Unity in Science" (Unpublished paper, University of Washington, Seattle, 1974); Richard F. Carter, "Communication as Behavior" (Paper presented at Association for Education in Journalism, Fort Collins, Colorado, 1973); Richard F. Carter et al., "Application of Signaled Stopping Technique to Communication Research," in New Models for Communication Research, ed. Peter Clarke, (Beverly Hills, Calif.: Sage, 1972), 15-44. Sense-making owes a debt, as well, to the works of: Jerome Bruner, Beyond the Information Given (New York: W. W. Norton, 1973); Jesse Delia, "Alternative Perspectives for the Study of Human Communication," Communication Quarterly 25 (1977): 46-62; Paolo Friere, Pedagogy of the Oppressed (New York: Seabury Press, 1974); Clifford Geertz, The Interpretation of Culture (New York: Basic Books, 1973); Anthony Giddens, The Constitution of Society: Outline of the Theory of Structuration (Cambridge, Mass.: Polity Press, 1984); Jurgen Habermas, Theory of Communicative Action II: Lifeworld and Systems, trans. T. McCarthy (Boston: Beacon Press, 1987); Jurgen Habermas, Theory of Communicative Action I: Reason and the Rationalization of Society, trans. T. McCarthy (Boston: Beacon Press, 1984); Harvey Jackins, The Human Situation (Seattle: Rational Island Publishers, 1973); Klaus Krippendorff, "On the Ethics of Constructing Communication," in Rethinking Communication 1: Paradigm Issues, eds. Brenda Dervin et al. (Newbury Park, Calif.: Sage, 1989), 66-96.

3 For information needs assessments directed to public libraries, see, in particular, Rita Atwood and Brenda Dervin, "Challenges to Sociocultural Predictors of Information Seeking: A Test of Race versus Situation Movement State," in Communication Yearbook 5 (New Brunswick, N.J.: Transaction, 1982), 549-69; Brenda Dervin and Kathleen Clark, "Asking Significant Questions: Alternative Tools for Information Need and Accountability Assessments by Libraries" (Report to California State Library, July 1987). For information needs assessments of blood donors, see, in particular, Brenda Dervin et al., "Improving Predictors of Information Use: A Comparison of Predictor Types in a Health Communication Setting," in Communication Yearbook 5 (New Brunswick, N.J.: Transaction, 1982), 806-30; Brenda Dervin et al., "Measuring Aspects of Information Seeking: A Test of a Quantitative/Qualitative Methodology," in Communication Yearbook 6 (Beverly Hills, Calif.: Sage, 1982), 549-69. The study of users of television programming guides is in progress.

4 For sense-making designed accountability studies of public libraries, see, in particular, Dervin and Clark, "Asking Significant Questions"; Brenda Dervin and Benson Fraser, "How Libraries Help" (Report to California State Library, October 1985). The archdiocese study is in progress.

5 Brief reports on image studies are included in references listed in note 1.

6 Reported in Atwood and Dervin, "Challenges to Sociocultural Predictors."

7 Reported in Dervin et al., "Improving Predictors of Information Use" and Dervin et al., "Measuring Aspects of Information Seeking."

8 Reported in Dervin and Clark, "Asking Significant Questions," 211-30.

9 Reported in Dervin, "Audience as Listener and Learner."

10 Reported in Michael Nilan, "Structural Constraints and Situational Information Seeking: A Test of Two Predictors in a Sense-Making Context" (Ph.D. diss., University of Washington, 1985).

[11]Reported in Scott Wittet, "Information Needs of Southeast Asian Refugees in Clinical and Hospital Situations" (Master's thesis, University of Washington, 1983).

[12]Particularly helpful to the author in developing this chapter have been Richard F. Carter, "Comparative Analysis and Theory in Communication" (Paper presented to the International Communication Association, San Francisco, 1989); "Ferment in the Field" (special issue), *Journal of Communication* 33, no. 3 (Summer 1983); Anthony Giddens, "The Orthodox Consensus and Emerging Synthesis," in Dervin et al., *Rethinking Communication* 1, 53-65; Stuart Hall, "Ideology and Communication Theory," in Dervin et al., *Rethinking Communication* 1, 40-52.