1 Information Needs and Uses

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INTRODUCTION

This chapter reviews the post-1978 literature on information needs and uses. Since prior *ARIST* chapters on this topic have considered such studies to have included virtually all user studies, we have taken that stance as this chapter's normative mandate.

With this mandate as a baseline, a review of relevant databases yielded more than 300 potentially useful citations since 1978. This finding agrees with earlier assessments of the immensity of the relevant literature base (CRAWFORD; KRIKELAS).

Faced with such an immense task, we sought to narrow our focus in a way that would be generally illuminating of the state of information needs and uses research. We decided to focus on issues relating to the conceptualizations that drive the research. This choice was made for two reasons. First, it seemed the natural outgrowth of the critiques of the state of research presented in prior *ARIST* chapters. Second, it seemed the logical choice suggested by the literature since 1978. Explanations of the basis for these two reasons follow.

A concern for conceptual impoverishment in the information needs and uses literature has run through past *ARIST* chapters like a thin but obvious thread of many colors. The concern has manifested itself as calls to: 1) take advantage of theory from the social sciences (MENZEL); 2) develop theories

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and conceptual frameworks (CRANE; CRAWFORD; LIN & GARVEY; PAISLEY, 1968); and 3) improve the predictive value of theory (LIPETZ). In addition, if issues of methodological choice and attitudinal perspective are seen as rooted in conceptualization, *ARIST* authors ALLEN, HERNER & HERNER, and MARTYN can also be defined as making a call for conceptual attention.

Three quotes typify the strongest of the statements from prior *ARIST* chapters:

> . . . there is a growing realization. . .of the lack of and need for a conceptual framework within which the enormous amount of data. . .can be meaningfully integrated (LIN & GARVEY, p. 6).

> Information is a human asset that can be exploited for the improvement of the human condition. In order to exploit this resource fully, a change in the attitudes of the whole community [i.e. information science community], of the scale of a social revolution, is required. . .(MARTYN, p. 21)

> The predictive value of theory in this field is still extremely poor. . . .But it seems clear that, at least for the next few years, the prevailing path to information system development will continue to be through only dimly enlightened trial and error. (LIPETZ, p. 26)

The second reason for focusing on conceptualization here is rooted in our observation of the current information needs and uses literature. This literature exhibits a tension. On the one hand, most of the empirical studies look very much like those reviewed in past *ARIST* chapters. On the other, a number of detailed critical essays have emerged calling for fundamental reassessments of what information needs and uses research is about. These essays address, in particular, a concern for conceptualization and, more particularly, a concern for the nature of basic assumptions and definitions. These essays (BELKIN, 1978; BELKIN ET AL., 1982a; DERR; DERVIN, 1983a; WERSIG & WINDEL; THOMAS D. WILSON, 1981, 1984) provide reviews of the treatment of basic concepts such as information and information need and/or underlying premises about the nature of information service and use and conclude that confusion about basic concepts is widespread and underlying premises may be untenable. Typical statements include these:

> . . .assumptions underlying [typical information retrieval systems] are sufficiently divorced from reality to make them quite untenable. (BELKIN ET AL., 1982a, p. 63)

> . . .the problem [in information needs research] seems to lie not so much with the lack of a single definition as with a failure to use a definition appropriate to the. . .investigation. (THOMAS D. WILSON, 1981, p. 3)

> . . .the empirically supported theoretical basis of information science, as far as users are concerned, is extremely poor. . . . (WERSIG & WINDEL, p. 12)

In the above criticisms, the term "conceptualization" is used in two senses. The first refers to what is usually more commonly called theorizing—i.e., the need for statements of expected relationships between variables. The second refers to lack of definition and clear premises for focusing on variables and generating research questions.

Here conceptualization is used in the second sense for two reasons. First, definitional conceptualization is seen as a necessary precursor to forming theories. Second, the innovative work in the literature since 1978 emphasizes definition. It is this definitional work that is the primary focus of this chapter.

In implementing this focus, this chapter deviates from prior *ARIST* reviews in two significant ways. First, little mention is made in this review of the differences between information systems (e.g., catalog, library, online system), subsets of users (e.g., students or adults, scientists or lay people), or contexts of use (e.g., occupational, recreational, or educational). These distinctions are referred to only if they aid understanding. Otherwise, we ignore them to highlight those features common to the conceptual issues addressed.

The second major deviation is that this chapter reviews both critical essays and empirical work. To focus only on empirical work since 1978 would misrepresent the literature because so much of the attention to information needs and uses research has been essentially calling for a change in these empirical approaches.

THE IMPETUS FOR CONCEPTUAL GROWTH

The recent spurt of emphasis on conceptual growth does not appear to result only from criticisms of research per se. Rather, the literature points to a major tension between information science research and practice. The tension results from the charge that studies have not informed practice. The tension so dominates the recent literature and so influences recent advances that it deserves special review.

THE PRACTICE MANDATE FOR USER-NEED ORIENTED STUDIES

In a series of critical essays, a number of authors have assessed the utility of these studies to date. They agree that the research has provided little guidance. STONE, for example, asserts that the literature gives little guidance to librarians on how to meet the needs of humanities scholars and is more likely to confuse than elucidate. THOMAS D. WILSON (1984) states that the service implications from past work have not been clear. WHITE concludes that the studies have reiterated only what information systems have put in users' minds and have not helped us to deal with real problems. Others have

made related charges (BELKIN, 1984; BELKIN ET AL., 1983; CRONIN; DERVIN, 1977, 1983b; MARON; MICK ET AL.; ZWEIZIG).

The call for research useful to practice arises also from the changing fundamental understandings of the nature of the services provided by information systems and services.

Not everyone agrees with these propositions, and the dissenting voices are reviewed below. Nevertheless, the agreement is so strong in the current critical literature that it constitutes a kind of rallying call for research on information needs and uses.

These fundamental understandings can be summarized in four propositions:

- Information systems could serve users better—increase their utility to their clients and be more accountable to them.
- To serve clientele better, user needs and uses must become a central focus of system operation.
- Serving clientele better may require implementation of a system redesign mandate.
- Information systems have not capitalized on technology to help them serve clientele better.

The discourse relevant to each proposition is reviewed below through a selection of germane authors.

The Call for Serving Clientele Better

Several intersecting trends appear to be driving this call. One is a wish to decrease the marginality (THOMAS D. WILSON (1981) used this term) of many information services—in essence, to increase use. Based on empirical evidence, a host of authors decry the low use of virtually every kind of information system. Examples include: CHEN & HERNON (1982), DERVIN (1980), and WHITE on the low use of libraries by citizens; MENDEZ on the low use of information services by humanists; and STIEG on the low use of information sources by historians. Other authors (BALLARD; COOPER, 1978a; MOHR; THOMAS D. WILSON, 1981) make the same observations in general terms.

Another trend leading to the call to serve clientele better is the concern for empirical evidence showing imbalances in information flows to traditionally underserved clientele (BARUGH; DERVIN, 1980; DURRANCE, 1982).

A third trend is the increased call for accountability to clientele communities manifested in shifts in system performance measurement from prescriptive professional standards to measures based at least partly on assessments of how well clientele needs have been served (BALLARD; BRENNER ET AL.; BENGE; BLAGDEN, 1980a, 1980b; BOOKSTEIN; COOPER, 1978b; D'ELIA, 1980b; DETWEILER; DUMONT & DUMONT; FORD; HEIM; LYNCH; MOHR; PALMOUR ET AL., 1980; ROBERTSON; SELL; PATRICK WILSON, 1978, 1983).

The Call for the Centrality of User-Defined Information Needs and Uses

In a related series of critical essays, a general call has been to make information needs and uses a central focus of information systems and, for many authors, the central focus (BELKIN, 1984; GARVEY ET AL.; MICK ET AL.; THOMAS D. WILSON, 1981). This call is illustrated by two quotes:

> . . .it becomes increasingly clear that the success of information services is more likely to be achieved through adjusting the services to meet the specific needs of an individual rather than trying to adapt the individual user to match the wholesale output of an information system. (GARVEY ET AL., p. 256)

> Effective transition into the information age will require switching from information systems that are technology and content driven to information systems that are user driven. (MICK ET AL., p. 355)

These calls have generally focused on a recognition that both research and practice now look at users in terms of the information system orientations and that we need to focus on the users themselves. Among those who have called for the switch to user orientations in information system practice and research are: BELKIN (1984), BELKIN ET AL. (1982a; 1982b), BRETON, CRONIN, DERVIN (1977; 1980; 1983a; 1983b), DURRANCE (1984), FORD, GARVEY ET AL., JARVELIN & REPO, KRIKELAS, LOWRY, MACMULLIN & TAYLOR, MARON, OFORI-DWUMFUO, PAISLEY (1980), ROBERTSON, VERMUELEN, WHITE, WILLIAMSON, and WOOSTER. Other terms used to describe this switch are user orientations vs. technology, content, document, service, data, and observer orientations.

These calls point to the lack of user orientations as a major (for many *the* major) stumbling block to more efficient and effective service. The tautological relationship between practice and research in this regard was emphasized by DERVIN (1983b) and by MARON. System orientations generate the research, which in turn generates findings that reify system orientations.

The Call for Implementing a System Invention Mandate

An important aspect of the general call for refocusing attention on users is the potential for the results to be used in reinventing and redesigning systems. For most of the voices, the call for user-oriented emphases in systems is weak. No specific implications for service or system design result. In contrast, a few scholars converge in critical essays on explicit calls for making information systems user oriented and see user research as the way to implement the changes.

The call for system changes includes virtually every aspect of what touches the user—i.e., the way that documents and materials are stored, the records that are created to locate documents and materials, and the person-machine or person-person links. Proposed user-oriented changes include:

- Treating documents in various ways to make the system more meaningful to users (SWIFT ET AL.).
- Devising new indexes based on user-relevant criteria to supplement subject-oriented indexes (BRETON; DERVIN, 1983b; MACMULLIN & TAYLOR).
- Including emotionally oriented indexes that address emotional dimensions of experience among the ways to access materials (DERVIN 1983b; MCMULLEN).
- Changing the procedures by which user needs are assessed in practice, from keyword, symbol-matching, and subject orientations to user-problematic situations (BELKIN ET AL., 1982a, 1982b; DERVIN & DEWDNEY; HOLLNAGEL; ODDY; OFORI-DWUMFUO).
- Presenting information in whatever form the end user requires (DAVIES).

Many of these calls imply a mandate for responsive, flexible system design that is oriented toward user needs. LANS, for example, asks for systems that are flexible and able to adapt to changing user needs. BRENNER ET AL. assert that information systems must constantly respond to end users and change as the users do. BELKIN (1980), DERVIN & DEWDNEY, and ODDY call for systems that can elicit user need statements through an interactive, responsive dialog.

The Call for Capitalizing on Technology

In this context, many authors view technology as the way to reorient systems to users. Many also believe that this potential has remained potential and that despite technological power, information systems remain mainly "giant matching devices" (BRENNER ET AL.; JARVELIN & REPO).

The Recognition of a Research Gap

It is in the context of these calls for reorienting the practice and evaluation of information systems to users that the criticism of the available research on information needs and uses is severest. Among these critics there is agreement that research has not yet provided guidance for the reorientation. Yet, most believe that the quest is still hopeful and issue a challenge for the coming decades of research on information needs and uses. Three authors illustrate this hope (BRENNER ET AL.; HEIM; MOHR).

Counter Voices

Dissenting voices are also heard. SHINEBOURNE, for example, challenges that there is "something rather absurd in being constantly enjoined to meet the needs of the users" (p. 137) and cites studies suggesting that when libraries have probed needs, the outcomes have been worse rather than better. Suggesting that the field has been "charmed by incantations about user needs," he calls for efforts to develop better procedures to more fully describe the features of texts and materials.

While SHINEBOURNE presents the most fully cast dissenting argument, others agree with him. LANCASTER and MARTYN & LANCASTER dismiss information needs assessment studies as weak or "largely a waste of time" (LANCASTER, p. 308); ABRAHAM warns against exaggerating user assessments in library evaluation; BALLARD cautions against expectations that are too high, referring to numerous social science studies that have shown how hard it is to change behavior.

A different counter voice from those above suggests that what is involved in these issues is not having to choose between user vs. system orientations but rather understanding when a particular orientation will be most productive. THOMAS D. WILSON (1981) makes this point when he calls for use of research definitions that are appropriate to the purpose. DERVIN (1983b) makes the same point when she suggests that there are utilities to be derived from both orientations.

BASELINE PORTRAIT OF INFORMATION NEEDS AND USES STUDIES

Without the context above, it would be difficult to make sense of the information needs and uses literature since 1978. At best, one would be able to observe a certain schizophrenia. On the one hand, the brunt of the work looks much like work reviewed in prior *ARIST* chapters. On the other, a small but significant portion of the work is going off in seemingly unrelated directions.

In terms of the discussion above, it seems that most of the studies continue to observe users in terms of systems while a few studies are finding ways to observe users in terms of users.

The system-oriented studies are reviewed briefly here because they provide a baseline portrait of the context within which some researchers are forging ahead, against tradition, to provide conceptual alternatives.

A typical study in the systems-oriented genre examines the extent to which a respondent (user or potential user of an information system) has: 1) used one or more information systems, used one or more different kinds of information services or materials; 2) sees one or more barriers to the use of the information system; and 3) reports satisfaction with various attributes of the system and access to it.

A typical study has tried to explain differences among respondents of these "information behavior" dimensions with such predictors as demographic (e.g., age, education, sex), sociological (e.g., group membership), life style (e.g., interests and activities), and task description (e.g., purpose for contacting system).

Many studies since 1978 fit primarily into this system-oriented genre. Examples include those by: AIYEPEKU (1982a; 1982b; 1982c), BEAL, BLACKIE & SMITH, BISHOP & LEWIS, BREMBER & LEGGATE, CHEN & BURGER, CHEN & HERNON (1980; 1982), FISCHER, HIBBERD & MEADOWS, HODOWANEC, MANCALL & DROTT, MOREHEAD, PALMOUR ET AL. (1980), SELL, SINGH, STIEG, SUMMERS, and SUMMERS ET AL.

Since an emphasis on user needs permeates the mandate for user-oriented research and system design as described in earlier sections of this chapter, a description of how these studies have dealt with the concept of "information needs" is appropriate.

Most of these studies imply that the "information behaviors" observed are indexing information needs and uses. Usually, the studies have left the terms "information needs" and "information uses" undefined, and it is implied that by knowing how users have or might use systems, one knows what their needs are or might be.

Because various fundamental terms are used interchangeably and not defined in these studies, extracting definitional patterns is not straightforward. By focusing on what the studies seem to imply to be evidence of need, it becomes possible to extract six different approaches to "information needs assessment" that underlie this system-oriented literature. These six approaches are described below, each illustrated with a typical study that incorporates the approach. No study was found that used only one of these approaches; the typical study used three or more. The studies selected provide particularly clear examples of implementation.

The Demand on System/Resources Approach

This approach measures the extent to which users use different kinds of sources, media, systems, documents, materials, or channels. Need is implied as assessed from portraits of where demand is greatest or where it is less than it ought to be, by professional judgment. A typical example is the study by STIEG of the information needs of historians, which focused primarily on how much the historians used different information channels.

The Awareness Approach

These measurements focus on determining respondent awareness of current services. Need is implied as assessed where areas of awareness are deemed lower than they ought to be, by professional judgment. A typical example is the study by BISHOP & LEWIS of users and uses of the British

National Bibliography (BNB) and its online computer-handled form, BLAISE-LINE. Among the measurements were assessments of user awareness of the overlap between BNB and BLAISE-LINE.

The Likes-Dislikes Approach

These measurements focus on determining how much people are satisfied or dissatisfied with different aspects of service. Those aspects that satisfy are seen as indicating a need for more service. Those that do not satisfy are usually seen as indicating a need for system improvement. A typical example of a study using this approach is that by HODOWANEC, which examined, among other dimensions, library user assessments of convenience and ease of access to information.

The Priorities Approach

In these measurements, respondents are asked to indicate what they would like the information to be like. Activities or characteristics indicated as having high priorities indicate need for development of service. CHEN & HERNON (1982) used this approach and asked their citizen respondents to generate a library wish list.

The Community Profile Approach

In these measurements, demographic and environmental profiles of a community are developed. The profiles are then used to infer program development needs. A typical example of this approach is illustrated in the PALMOUR ET AL. (1980) protocol for community analysis, which proposes that a library should develop a profile of the demographic characteristics of community members and the nature of community environments and facilities.

The Interests, Activities, and Group Memberships Approach

In these measurements, respondents are asked to detail their interests, activities, and their group memberships. Extrapolations are then made from the data to infer program development needs. An example of this approach is the PALMOUR ET AL. (1980) protocol for a citizen survey, which, among other dimensions, calls for assessing citizen memberships and involvements in clubs and community activities as well as citizens' interests and hobbies.

From these approaches to "information needs assessment" several patterns emerge. One is that most of the approaches are constrained by system definitions of what "needs" are and they are limited to examining behavior primarily within user intersections with systems. In fact, it could be said that the needs of interest are system needs not user needs.

Another manifestation of the system-oriented research emphasis on system rather than user needs is how the studies reify systems as they presently exist. Respondents are usually offered a menu of options that originate in system worlds, not user worlds. As DERVIN (1980) suggests, the results can only reinforce system stereotypes. When respondents are asked about worlds with which they are unfamiliar, they respond from contexts of fleeting images rather than from experiential realities.

A third manifestation is the fact that even when the work addresses aspects of user worlds outside the system intersection, it still does so in ways that are removed from user needs. Thus, it is assumed that if we know who people are, what groups they belong to, or what their activities and interests are, we know what their needs are.

Within these system-oriented studies one finds numerous attempts to break out of system-oriented constraints. The studies that propose looking at user interests and activities in contexts outside system intersection are prime examples. Other frequent examples are studies that have proposed or measured some aspect of actual user situations (BEAL; CHEN & BURGER; PALMOUR ET AL., 1980; WOOD).

These attempts usually remain constrained, however. An example is the CHEN & BURGER study of citizen information needs that assesses the kinds of troublesome everyday situations in which citizens find themselves but which then focuses prime attention on citizen library use and satisfaction.

Recent critiques of the literature suggest that in order to develop user-oriented research alternatives for the study of information needs and uses what is required is not merely the introduction of new methods or variables but rather a shifting away from the traditional paradigm that guides information science research.

CALL FOR A PARADIGM SHIFT

Since 1978 some scholars have focused their primary efforts on identifying the underlying premises and assumptions that they see as having guided information needs and uses research. They call for developing an alternative set of premises and assumptions—in essence, for the introduction of an alternative paradigm. Notable among these are: BELKIN (1978), BROOKES, DERVIN (1977; 1983b), HAMMARBERG, JARVELIN & REPO, LEVITAN, MARKEY, MICK ET AL., NEILL, RUDD, and THOMAS D. WILSON (1981; 1984).

These authors categorize the underlying premises and assumptions in different ways. Despite these differences, the authors all discuss alternative approaches for thinking about fundamental elements of information needs and uses research—the definitions of information and need, the nature of information use, the utility of different approaches for studying information behaviors, and the consequences of using different models for prediction. Each author, either directly or indirectly, also pits at least two alternative perspectives against one another: one is the perspective now used, the other is a suggested alternative.

For our purposes, the assumptions and premises seen as now operating in research are labeled "traditional" and are contrasted to "alternative" assumptions and premises. The pitting is not presented to label assumptions and premises as inherently good or bad but rather to pursue the implications of the use of alternative approaches.

Six categories are used below to overview the underlying premises and assumptions that have been identified as operating in traditional information needs and uses research. A summary describes how the six categories intersect to yield a "traditional" paradigm and "traditional" studies and what kind of "alternative" paradigm is proposed. Most of the literature pertaining to alternative approaches is conceptual and critical. However, a significant subset has advanced to empirical implementation. This literature is the focus of the final section of this chapter.

Objective vs. Subjective Information

In many ways this distinction is the least precise dimension of the called for paradigm shift, but it is also the one that has received the most attention. Most observers agree that information needs and uses studies have focused on objective information, on a conception of information as something that has constant meaning and some element of absolute correspondence to reality.

Whether information needs and uses studies ought to focus on objective information is a matter in contention. Scholars such as BROOKES and FARRADANE (1979; 1980b) argue cogently that it ought to, that it is these constant meanings that information systems ideally are in the business of transferring from information producer to receiver. Farradane, for example, acknowledges that human subjectivity results in a reality in which information does not transmit constant meaning. He proposes, however, that every effort ought to be made to describe and transmit the information producer's intent.

In contrast, some authors reject the objective information idea. SWIFT ET AL., as one example, call the objectivist assumptions inappropriate to studies of human beings. Others who specifically address this issue are BELKIN (1978), DERVIN (1977; 1983a), NATOLI, NEILL, RUDD, and THOMAS D. WILSON (1984).

Mechanistic, Passive vs. Constructivist, Active Users

It has been challenged that traditional studies of information needs and uses have posited the user as a passive recipient of objective information, with the task of information delivery being to get the information package into the user's hands. In this context it has been assumed that all information system use is by definition useful (BLAGDEN, 1980a). A focus on behavior (i.e., what people do) has actually been ignored. People have been thought of as robotic information-processing systems (STEVENSON). States of being informed or benefited have been assumed to ensue directly from document

delivery with no intervening user behavior (KRIKELAS; MAGUIRE). In short, people have *not* been seen as purposive, self-controlling, sense-making beings (JAMES). As a result, much user behavior remains unexamined—e.g., how users construct needs out of situations or helps out of services, or the strategies they use for bridging their information needs (BEAL; DERVIN, 1977, 1983a; MOHR).

Trans-Situationality vs. ty

Traditional information needs and uses studies have attempted to predict user behavior according to static, across time-space models. The intent was to find ways to describe user information behavior that apply across situations. Ideally, the resulting observations would fit all users in all situations.

Of all the assumptions that have driven information needs and uses research this was the one that received the earliest assault. The calls by PAISLEY (1968) and ALLEN for delineating sociological contexts of use are manifestations of a recognition that trans-situational prediction has not been productive.

Yet, despite the many years during which sociological and other situational context variables have been addressed in the literature, few conceptual approaches have been developed to deal with situational variables that are anything other than cumbersome laundry lists of unordered dimensions of experience. Recently, however, calls have been issued for doing so. HALL suggests that individuals operate from different centers at different times and that the shapes of their cognitive maps shift accordingly. He wants to see information science address the systematic patterns underlying these situational moments. DERVIN (1983a) and MACMULLIN & TAYLOR make a similar request.

Another aspect of the call for a situational orientation is manifested in the references from scholars to the need for measurements that will allow users to be understood as a result of dialog between system and user in which need articulation goes through situationally bound iterations (BELKIN ET AL., 1982a, 1982b; CURRAN; DERVIN & DEWDNEY; ODDY). A final aspect of the situationality focus is the calls that require systems to make repetitive needs assessment a mandate (CURRAN; DERVIN, 1984).

Atomistic vs. Wholistic Views of Experience

Traditional information needs and uses studies have zeroed in on user behavior primarily in the context of user intersection with systems. They have not examined factors that lead to a user's encounter with information systems or the consequences of such an encounter. It is as if a still photograph were taken of a scene that would be more adequately portrayed by moving pictures.

Various scholars have urged more wholistic approaches. BENGE, for example, wants us to focus on the whole social interaction; THOMAS D. WILSON (1981) and MACMULLIN & TAYLOR want the focus to go beyon the system intersection to the points where use and effects occur; DERVI (1980) calls for looking at information behaviors outside system contexts s that they can be examined independently of system constraints.

External Behavior vs. Internal Cognitions

Perhaps the aspect of the paradigm shift that is most contentious focuses on whether information needs and uses research ought to focus on external behaviors or internal cognitions. Traditionally, research has focused on externals (e.g., contacts with sources and use of systems as indicators of needs) rather than internals (e.g., cognitive assessments).

Because of its roots in the physical sciences, the call for focusing on externals and the assumption that psychological, cognitive states cannot be scientifically observed permeated even the early years of research. The first *ARIST* review (MENZEL) called for work that stuck to observables, constraining itself to contact with systems. The concern is still manifested in recent work (DERR; MICK ET AL.).

Although these are dissenting voices, most scholars who have explicitly addressed the issue join the call for focusing on cognitive behavior and developing cognitive approaches to assessing information needs and uses (BELKIN, 1978; BELKIN ET AL., 1982a, 1982b; DERVIN, 1977, 1983a, 1983b; FORD; GARVEY ET AL.; PAISLEY, 1980; THOMAS D. WILSON, 1984). Both Ford and Paisley, in particular, reviewed a large amount of literature from cognitive psychology suggesting potential contributions for information science.

Chaotic vs. Systematic Individuality

A fundamental issue of this paradigm debate is the concern for research to yield systematic observations and for systems to be based on orderly patterns of behavior. In the context of the traditional paradigm assumptions, research was always a tradeoff between the increasingly evident need to deal with individuality and a fear that lack of predictability would result. A recent article by MICK ET AL., for example, sees a focus on individual behavior as yielding too much variation for systems to integrate.

Until recently, it was assumed that individuality meant chaos, an implied descent into solipsism. Recent calls now challenge that point (BELKIN, 1978, 1984; DERVIN 1983a, 1983b; DERVIN ET AL.; HOLLNAGEL). HALL, for example, calls for the inclusion of individual "values" in information science research and for the right of the user to be different. He observes that just because values are variable "does not mean they are erratic." As he puts it: "we are concerned. . .with trying to characterize 'bias' systematically so it can be put to constructive use" (p. 110).

Others have made the same claim. DERVIN (1983b) calls for addressing the fundamentals of the human condition as a means for systematizing

individuality. PAISLEY (1980) suggests that people seem to share some common dimensions for constructing experience. What is emerging is an understanding that the seeming complexity of individuality can be addressed (as HOLLNAGEL puts it) "in a completely satisfactory way which fulfills every reasonable demand of a scientific investigation" (HOLLNAGEL, p. 186).

Quantitative vs. Qualitative Research

The traditional approaches to information needs and uses research have aspired to sophisticated quantitative techniques. This theme has run through all prior *ARIST* reviews of the topic. In the context of the traditional paradigm, quantitative approaches are seen as most compatible with traditional assumptions. Yet in the context of the impetus of the paradigm shift, scholars are now calling for supplementing quantitative approaches with inductive, qualitative approaches. These calls have come primarily from BEAL, HALL, JAMES, JARVELIN & REPO, MARKEY, and THOMAS D. WILSON (1984).

The Paradigms—"Traditional" and "Alternative"

An intersection of the above categories yields a portrait of the "traditional" paradigm. It is one in which information is seen as objective and users are seen as input-output processors of information. It is one that searches for trans-situational propositions about the nature of the use of information systems. It does this by focusing on externally observable dimensions of behavior and events.

A study generated within such a paradigm would frequently focus on research questions that start with the system—the source of the packages of information that are to be transferred from system to user. Such a study looks at how much use people make of these systems. It asks what demographic and observable sociological dimensions of people's lives predict this use. It is concerned with whether people are aware of these systems and like them or dislike them. It asks many "what" questions—e.g., what people use what systems, and what services do people use.

In contrast, the "alternative" paradigm posits information as something constructed by human beings. It sees users as beings who are constantly constructing, as beings who are free (within system constraints) to create from systems and situations whatever they choose. It focuses on how people construct sense, searching for universal dimensions of sense-making. It focuses on understanding information use in particular situations and is concerned with what leads up to and what follows intersections with systems. If focuses on the user. It examines the system only as seen by the user. It asks many "how questions"—e.g., how do people define needs in different situations, how do they present these needs to systems, and how do they make use of what systems offer them.

THE IMPACT OF PARADIGMATIC CONSTRAINTS ON CONCEPTUALIZATION

The impact of the constraints of the old paradigm and the changes introduced with the new are no more clearly shown than in an examination of the alternative definitions of the two central concepts of information needs and uses research that are now emerging—information and information need. Both terms have been universally considered troublesome. Many different definitions have been used or implied. For example, information has been defined as: 1) a property of matter; 2) any message, document, or information resource; 3) any publicly available symbolic material; or 4) any data. BELKIN (1978), LEVITAN, and THOMAS D. WILSON (1981) all review the various definitions.

Similarly, "information need" has been defined as a state of needing anything the researcher called information. Almost without exception "information needs" have not been defined as what users think they need but rather in terms that designate what it is in the information system that is needed. The definitions have not focused on what is missing for users (i.e., what gaps they face) but rather on what the system possesses.

The constraint of the traditional paradigm in this regard is most clearly illustrated in the amount of discussion that has focused on whether information needs can be accurately measured. When information needs are viewed in terms of the traditional paradigm, they are indeed shifty and vague. The evidence shows, for example, that users frequently have trouble stating these needs, particularly when pressed to specify what resources will fill them. Further, the way needs are expressed changes over time, even during a brief interview. Users frequently refer to gaps, which information systems see as falling outside their purview or as being unamenable to objective stored knowledge. Numerous references have been made to the difficulty of dealing with the concept (DERR; JARVELIN & REPO; MARKEY; THOMAS D. WILSON, 1981).

When the paradigm shifts described above are brought to bear on defining "information" and "information need," quite different definitions begin to emerge. What is most remarkable about them is their similarity. As examples, two recent sources define "information" as: 1) that which is capable of transforming image structures (BELKIN, 1978), and 2) any stimulus that alters the cognitive structure of a receiver (PAISLEY, 1980).

"Information needs" are similarly defined: 1) a conceptual incongruity in which the person's cognitive structure is not adequate to a task (FORD); 2) when a person recognizes something wrong in his or her state of knowledge and wishes to resolve the anomaly (BELKIN, 1978); 3) when the current state of possessed knowledge is less than needed (KRIKELAS); 4) when internal sense runs out (DERVIN, 1977; 1980); and 5) when there is insufficient knowledge to cope with voids, uncertainty, or conflict in a knowledge area (HORNE).

All of the alternative definitions bring the proposed paradigmatic changes to bear on conceptualization. Those who propose these changes see both

traditional definitions and alternative definitions as useful, depending on purpose (DERVIN, 1983a; LEVITAN; THOMAS D. WILSON, 1981). They see the alternative definitions as more useful for research that proposes to understand users and to apply its findings to system design and practice. Some scholars have begun to make substantial progress in implementing these definitions in conceptual and empirical efforts. These are described briefly below.

EXAMPLES OF ALTERNATIVE SCHOLARSHIP

This section focuses both on extensive conceptual efforts that point to research directions and on efforts that have actually moved to the research stage. In addition, both small-scale innovations and comprehensive efforts are described.

Small-Scale Innovations

Only a few scholars have produced efforts large enough to be labeled comprehensive. However, the literature manifests some researchers who have begun to add elements of the alternative paradigm to research efforts. These small-scale innovations are important, both as a symptom of dissatisfaction with the constraints imposed by the traditional paradigm and as input for the collective struggle to emerge from it. As examples:

- GARVEY ET AL. have examined the different kinds of information that scientists need at different research stages. Their kinds of information were defined functionally. Sample categories include aid in perception, definition of problem, place in context of other work, and select design strategy.
- BLAGDEN (1980a) showed users some documents that they had borrowed and found that users could vividly recall the circumstances surrounding each particular information-seeking incident.
- DURRANCE (1982; 1984) examined public policy information needs of citizen groups by eliciting statements of problematic situational activities.
- WILSON & STREATFIELD and WILSON ET AL. tracked 22 respondents through 6,000 communication events occurring in work situations in a social services department to examine their information seeking and use.
- WOOD focused on specific situationally bound information problems when interviewing 136 occupational health practitioners.
- HORNE defined questions as the observable behavioral indicators of information needs. She examined the questions of 198 students in four different problem-solving situations and used linguistic categorization techniques (e.g., open vs. closed questions) to unearth fundamental question types.

Comprehensive Innovations

Three different kinds of comprehensive innovations are described. Each represents a different way of implementing most of the elements of the paradigm shift described earlier.

The User-Values Approach

The most fully developed version of this approach comes from TAYLOR (1984; 1985) and MACMULLIN & TAYLOR, who term it the value-added approach. It focuses on the perceptions of utility and value that users bring to systems. At this stage, the work as represented in the published literature is primarily conceptual, but it points to research directions.

MacMullin and Taylor call for making the user's problem the central focus. They are concerned with eventually identifying different classes of problems and linking them to different information traits that users are more likely to value when faced with each class of problem. They propose a variety of situationally based problem dimensions—e.g., design vs. discovery, well structured vs. poorly structured, complex vs. simple, specific vs. amorphous, and assumptions agreed on vs. those not agreed on; they see these as contexts that establish the criteria for judging the relevance of information.

They also propose various information traits—e.g., quantitative vs. qualitative, hard vs. soft data, single solution vs. options, precedence vs. forecasting vs. futures modeling time perspectives, and clinical vs. census aggregation. These information traits, they say, are as "characteristic of stored information as are subject descriptions" (MACMULLIN & TAYLOR, p. 101).

In an effort to further understand the potential for indexing user-oriented information traits, TAYLOR (1984; 1985) analyzes 13 abstracting and indexing operations to ascertain what steps might help users to make choices from the information displayed. He examined: 1) different kinds of user criteria (e.g., ease of use, quality, adaptability); 2) different kinds of interfaces (e.g., browsing, formatting, accuracy, comprehensiveness); and 3) different system processes (e.g., alphabetizing, grouping, highlighting, indexing, citation links). Again the implication is that these indicators of values can be formalized and addressed directly in information-system activity.

This body of conceptual work can be seen as reaching for two different kinds of understandings: 1) of problems (or cognitive criteria) users bring to bear on systems; and 2) of different characteristics of information and information bases that would allow users to locate whatever might serve their criteria. This work clearly draws on a long tradition of cognitively oriented work in information processing.

In a related piece of fairly well-developed conceptual work, HALL focuses on the "parameters of value" that scientific/technical information users bring

to use situations. "Each separate viewpoint or way of looking at things," he says, "has its own characteristic priorities for evaluating information. (HALL, p. 105)"

He examines different parameters of value for information (e.g., specificity, depth vs. breadth, timeliness) and how the kinds of information that would serve each value parameter might vary with different situations (i.e., function stages). For example, in the planning stage, the value parameter of hands-on access is posited as calling for information in the form of digests of points of view. In contrast, in the research and development stage, the same parameter is posited as calling for all pertinent original documents, and in the information-operations stage, the call is for abstracts and references.

Related proposals to link different cognitively and/or situationally described problem situations to different information traits have been made by FORD, GARVEY ET AL., MOHR, and PAISLEY (1980). In addition, the work of FARRADANE (1979; 1980a; 1980b) to develop a "relational indexing system" is a related effort.

Farradane, in fact, operates far more out of traditional assumptions than alternative assumptions. He acknowledges that different people see different things in messages. Given this discontinuity, he says that we need to develop a way to more fully represent the intents of sources in order to achieve greater indexing accuracy. He builds indexing procedures that are based on analyses of thought processes drawn from cognitive psychology. The actual indexing procedures are complex, and it is not necessary to describe them here. His reliance on objective information assumptions has been soundly criticized (HAMMARBERG), and applications of his system have been described as both uneconomical and unpromising in terms of recall and relevance results (FORD).

From the perspective of the alternative paradigm, Farradane goes astray in expecting the language of documents to yield exact descriptions of either source intent or receiver understanding of source intent. However, his work is useful where it applies cognitive psychology to descriptions of documents.

The Sense-Making Approach

The sense-making approach has been developed by Dervin and her colleagues over the past 13 years. It consists of a set of conceptual and theoretical premises and a set of related methodologies for assessing how people make sense of their worlds and how they use information and other resources in the process (DERVIN, 1977, 1980, 1981, 1983a, 1983b; DERVIN & FRASER). It is one of several related approaches which are being developed in the field of communication (EDELSTEIN; GRUNIG; STAMM & GRUNIG), all of which implement aspects of the alternative paradigm for studying communication behavior. Sense-making is the only one of these approaches that has been applied to librarianship and information science.

The approach has been used to describe information needs and uses of people in diverse contexts—e.g., blood donors, cancer patients, immigrants, developmentally disabled adults, library users, computer software users, and

children using television (ATWOOD ET AL.; DERVIN, 1983b). One primary use has been to study the everyday information needs of average citizens and to apply the findings to public library service (ATWOOD & DERVIN; DERVIN, 1984; DERVIN ET AL.; PALMOUR ET AL., 1979).

The bottom-line intent of the approach is to yield data that are directly useful for information and communication practice. In looking for ways to deal systematically with the chaos of individuality, it draws heavily on the work of CARTER (1980) and CARTER ET AL. In particular, it rests heavily on his posited discontinuity condition as presenting a mandate for humans to take steps to construct sense in constantly changing life situations.

In this context, Dervin emphasizes the mandate for step-taking as an organizing focus for conceptualizing. She posits an information-need situation as one in which the individual's internal sense has "run out." The person must create new sense. In the latest version of the sense-making approach, a three-part model points to the "essences" of information-need (i.e., sense-making) situations. The model is labeled SITUATION-GAP-USE. The sense-maker is stopped in a situation. Movement is prevented by some kind of gap (operationalized for information-need situations as a question or question set). The sense-maker is seen as potentially making some kind of use of whatever bridge is built across the "gap" the user faces.

In the various sense-making methodologies that have been developed, this model becomes operational when respondents describe moments when they got stopped, how they saw themselves stopped, what questions they had in their minds (i.e., what cognitive gaps they faced), what strategies they found useful for answering these questions (i.e., building bridges across the gaps), and how they used the cognitive bridges once they built them (i.e., how information helps).

In the 13 years of development, SITUATION-GAP-USE statements have been collected and their contents analyzed both inductively and deductively. The result has been the development of a stable set of categories for coding situations, gaps, and uses into what are assumed to be universally relevant dimensions of human movement.

Situations have been coded primarily in terms of how they are seen by users as constraining movement because it is assumed that this is where the situational essence of the information need lies. Categories have included the nature of the stop, described in terms of such categories as decision (facing a road with two or more branches ahead), problematic (being dragged down a road not of your own choosing), or spin-out (having no road). Other situation categorizations have focused on judgments of perceptual embeddedness (how foggy is the road), situational embeddedness (how many intersections are on the road), social embeddedness (how many people are also traveling), and constraint (what stands in the way).

When gaps are operationalized as questions, they have been coded into categories, tapping what are considered to be some universal elements of the ideas humans need to construct to guide their movements. A recent version codes questions into attempts to bridge gaps relating to the timing and location of events, understanding causes, projecting outcomes, and identifying characteristics of self, others, events, and objects.

Uses, also called helps, have been conceptualized as the ways in which people put answers to questions to work. A recent version codes uses into: got picture, ideas, understandings; found direction; gained skills; got started or kept going; got connected to others; got support/reassurance; got rest/relaxation; got happiness/pleasure; and reached goal.

Several small-scale applications of the approach have involved system design. One is the use of the "neutral questioning" procedures drawn from the SITUATION-GAP-USE model for conducting reference interviews. Sense-making posits that neutral questioning procedures can increase both efficiency and effectiveness of service delivery in reference interviews. This proposition is being tested empirically (DERVIN & DEWDNEY). The procedures have also been tested in use as a result of training workshops. It is estimated that the techniques have been taught to about 1,000 librarians and they are being systematically used in five libraries.

Also implied in the sense-making approach is the idea, similar to that in the values approach, that systematically describable dimensions of sense-making can be incorporated into information bases to make retrieval more effective and efficient. DERVIN (1983b) has suggested, for example, that records could be altered to supplement existing techniques with sense-making categories by requiring authors to address them and/or by having users assess them.

The sense-making studies have their earliest roots in a genre that deserves brief mention. They can be called the "everyday citizen information need studies." The first was completed in 1973 (WARNER ET AL.) and described the kinds of everyday need situations of citizens (e.g., housing, family, employment, welfare), the sources used by the citizens, and success in situation-facing. Recent examples are the studies by Chen and her colleagues (CHEN; CHEN & BURGER; CHEN & HERNON, 1980). In these studies, the information need is the topically defined situation (e.g., housing), and the remaining emphasis is placed on source use, library use in particular. The primary contribution of these studies is that they go outside the bounds of system intersection to assess need situations.

The Anomalous States-of-Knowledge Approach

The final example of an approach to information needs that incorporates most of the elements of the paradigm shift described earlier comes from the work of Belkin and his colleagues (BELKIN, 1978, 1980, 1984; BELKIN & ODDY; BELKIN ET AL., 1982a, 1982b, 1983). The approach starts with a situation in which someone with a problem needs help from some kind of information system. Belkin emphasizes that the approach doesn't focus on information needs but on people in problematic situations with views of the situations that are incomplete or limited in some way. In this context, users are viewed as being in anomalous states of knowledge (abbreviated to ASK), in which it is difficult to speak of or even recognize what is wrong. Because they face gaps, lacks, uncertainties, and incoherencies, they are seen as being unable to specify what is needed to resolve the anomalies.

Belkin and his colleagues have focused on describing the nature of the cognitive wrongness that the user brings to the information system. They do this using a free-form interviewing technique in which users are asked to describe the nature of the problematic situations that lead them to the search and what sorts of information they would like to have.

These situation descriptions are then analyzed by computer to develop statistical word occurrence and association portraits. What emerges is a graphic network of the frequency with which the respondent used word roots and the degree to which different word roots occurred in the problem statements in close proximity to each other.

The same statistical portrait is used to describe abstracts in the database, and then different strategies are used to match the word-association picture of the users with those of the abstracts. In studies done to date, users have evaluated how closely the graphic word-association portrait of their articulations of their situations matched their cognitive ideas about these situations. Abstractors have done the same for the pictures of their abstracts.

Attempts have also focused on identifying different kinds of problematic situations (e.g., well-defined vs. undefined topic, well-defined vs. not-defined problem) and to link them to different kinds of search strategies. For example, should the search focus on finding abstracts whose networks are identical to the problem statement, or should it focus on finding abstracts whose networks are mirror images?

In one application with 35 users, only two had ASK situations for which the traditional "best match" approach to information retrieval seemed intuitively better. The researchers have concluded that their tests of the ASK approach have been promising.

The main goal of the work has been to generate means by which information systems can yield documents from searches that are based on images, which are constructed in dialog, of the user's area of interest. Recent articles by Belkin and others have begun to delineate models of the elements of description of users that information mechanisms will need to know (e.g., problem dimensions, interaction modes and strategies, effects of decisions, aims).

Despite the fact that Belkin and co-workers say they are not assessing information needs per se, the similarity to the aims of the values and sense-making approaches are evident. All three approaches aim to isolate what users see as the fundamental dimensions of situations that can be related to different kinds of cognitive strategies that users will use to determine what kinds of information will be useful. The ultimate goal is still to apply this to practice.

Related approaches have been developed by ODDY and OFORI-DWUMFUO in the Thomas and Thomas II reference retrieval systems. What is similar about the Thomas systems is that they do not require the user to make a precise query statement. They aim, as with ASK, to satisfy incompletely defined user needs through human-machine dialog. As in ASK, through dialog, the machine forms an image of the user's view and then responds with reference to this image. What is different is that the Thomas systems are

based on traditional document descriptors while ASK focuses on free-scanned word roots.

CONCLUSION

The intent here has been to offer three alternative information needs assessment approaches as examples that have resulted from the call for a significant paradigm shift in information needs and uses research. While there are substantial and important differences in the three approaches, their similarities are more important here. Each approach is driven by alternative paradigmatic assumptions. Each is focused on wholistic process situationality and cognition. Each has moved toward nonobjective information assumptions by not demanding that a best match be made by the system to user needs. Each assumes that there are systematic fundamental underlying dimensions to what formerly was considered chaotic individuality. Each posits human beings as actively constructing rather than passively processing information. Each is focused on application to practice, to improve the efficiency and effectiveness of information delivery. Each points to different ways for assessing user needs and to different ways for describing and/or retrieving databases, collections, or records.

If one uses the *ARIST* reviews on information needs and uses (1966–1978) as a baseline, a quantum and revolutionary conceptual leap in this area has been made since 1978, and a few scholars have taken tentative steps down some promising roads Yet the leap would not have been possible without the tension created by the continuing quest to understand the elusive user. The struggle to break out of world views that constrain professional observations of users have been forged on many fronts, with each small step enriching the next. It appears that since 1978 the small steps have reached critical mass.

New mandates for information needs and uses research have been charted. At their core is the demand for inventing new ways of looking at users and linking systems to them.

BIBLIOGRAPHY

ABRAHAM, TERRY. 1980. Managerial Rating: A Library Effectiveness Model. In: Library Administration and Management Association Library Research Round Table, ed. Library Effectiveness. Chicago, IL: Library Administration and Management Association; 1980. 2–13.

AIYEPEKU, WILSON O. 1982a. Information Utilization by Policy-Makers in Nigeria, Part 1: Assessing Degree of Information Consciousness. Journal of Information Science. 1982 August; 4(5): 203–211. ISSN: 0165-5515.

AIYEPEKU, WILSON O. 1982b. Information Utilization by Policy-Makers in Nigeria, Part 2: Characteristics of Information Sources Used. Journal of Information Science. 1982 October; 5(1): 19–24. ISSN: 0165-5515.

AIYEPEKU, WILSON O. 1982c. Information Utilization by Policy-Makers in Nigeria, Part 4: Critical Factors in the Utilization of Information. Journal of Information Science. 1982 November; 5(2/3): 87–92. ISSN: 0165-5515.

ALLEN, THOMAS J. 1969. Information Needs and Uses. In: Cuadra, Carlos A., ed. Annual Review of Information Science and Technology: Volume 4. Chicago, IL: William Benton; 1969. 1–29. SBN: 85229-147-7.

ATWOOD, RITA; ALLEN, R.; BARDGETT, S.; PROUDLOVE, S.; RICE, R. 1982. Children's Realities in Television Viewing: Exploring Situational Information Seeking. In: Burgoon, Michael, ed. Communication Yearbook 6. Beverly Hills: Sage; 1982. 605–628. ISBN: 0-87855-447-5.

ATWOOD, RITA; DERVIN, BRENDA. 1982. Challenges to Sociocultural Predictors of Information Seeking: A Test of Race versus Situation Movement State. In: Burgoon, Michael, ed. Communication Yearbook 5. New Brunswick, NJ: Transaction; 1982. 549–569. ISBN: 0-87855-447-5.

BALLARD, THOMAS H. 1980. Collection Size and Effectiveness in Public Library Branches. In: Library Administration and Management Association Library Research Round Table, ed. Library Effectiveness. Chicago, IL: Library Administration and Management Association; 1980. 13–24.

BARUGH, JOHN. 1984. Community Information and the Public Library. Journal of Librarianship 1984 April; 16(2): 77–93. ISSN: 0022-2232.

BEAL, CHRISTINA. 1979. Studying the Public's Information Needs. Journal of Librarianship. 1979 April; 11(2): 130–151. ISSN: 0022-2232.

BELKIN, NICHOLAS J. 1978. Information Concepts for Information Science. Journal of Documentation. 1978 March; 34(1): 55–85. ISSN: 0022-0418.

BELKIN, NICHOLAS J. 1980. Anomalous States of Knowledge as a Basis for Information Retrieval. Canadian Journal of Information Science. 1980 May; 5: 133–143. ISSN: 0380-9218.

BELKIN, NICHOLAS J. 1984. Cognitive Models and Information Transfer. Social Science Information Studies. 1984 July; 4(2/3): 111–130. ISSN: 0143-6236.

BELKIN, NICHOLAS J.; ODDY, ROBERT N. 1978. Document Retrieval Based on the Automatic Determination of the User's Information Needs. Journal of Informatics. 1978 April; 2(1): 8–11.

BELKIN, NICHOLAS J.; ODDY, ROBERT N.; BROOKS, H. M. 1982a. ASK for Information Retrieval: Part I. Background and Theory. Journal of Documentation. 1982 June; 38(2): 61–71. ISSN: 0022-0418.

BELKIN, NICHOLAS J.; ODDY, ROBERT N.; BROOKS, H. M. 1982b. ASK for Information Retrieval: Part II. Results of a Design Study. Journal of Documentation. 1982 September; 38(3): 145–164. ISSN: 0022-0418.

BELKIN, NICHOLAS J.; SEEGER, T.; WERSIG, GERNOT. 1983. Distributed Expert Problem Treatment as a Model for Information System Analysis and Design. Journal of Information Science. 1983; 5(5): 152–167. ISSN: 0165-5515.

BENGE, RONALD. 1984. Where Are the Emperor's Clothes? Some Thoughts on Current Dilemmas: A Review Article. Journal of Librarianship. 1984 July; 16(3): 211–219. ISSN: 0022-2232.

BISHOP, JANE; LEWIS, PETER R. 1985. BLAISE-LINE and the British National Bibliography: Profiles of Users and Uses. Journal of Librarianship. 1985 April; 17(2): 119–136. ISSN: 0022-2232.

BLACKIE, EDNA; SMITH, JOAN M. 1981. Student Information Needs and Library User Education. Education Libraries Bulletin. 1981 Autumn; 24(3): 16-23. ISSN: 0013-1407.

BLAGDEN, JOHN F. 1980a. Do We Really Need Libraries? London, England: Bingley Publishing; 1980. ISBN: 0-85157-308-8.

BLAGDEN, JOHN F. 1980b. Benefit Assessment Methodology: The Key Priority for Library Research. In: Library Administration and Management Association Library Research Round Table, ed. Library Effectiveness. Chicago, IL: Library Administration and Management Association; 1980. 25-33.

BOOKSTEIN, ABRAHAM. 1979. Relevance. Journal of the American Society for Information Science. 1979 September; 30(5): 269-273. ISSN: 0002-8231.

BREMBER, V. I.; LEGGATE, P. 1985. Linking a Medicine User Survey to Management for Library Effectiveness: I The User Survey. Journal of Documentation. 1985 March; 41(1): 1-14. ISSN: 0022-0418.

BRENNER, LISA P.; HUSTON-MIYAMOTO, MARY; SELF, DAVID A.; SELF, PHYLLIS C.; SMITH, LINDA C. 1981. User-Computer Interface Designs for Information Systems: A Review. Library Research. 1980-81 Spring; 2(1): 63-73. ISSN: 0164-0763.

BRETON, ERNST J. 1981. Why Engineers Don't Use Databases. Bulletin of the American Society for Information Science. 1981 August; 7(6): 20-23. ISSN: 0095-4403.

BROOKES, BERTRAM C. 1980. The Foundations of Information Science—Part I. Philosophical Aspects. Journal of Information Science. 1980, October; 2(3/4): 125-133. ISSN: 0165-5515.

CARTER, RICHARD F. 1980. Discontinuity and Communication. Paper presented at East-West Center Conference on Communication Theory East and West, East West Center; 1980; Honolulu, HI. Available: Richard Carter, School of Communications, DS-40, University of Washington, Seattle, WA 98195.

CARTER, RICHARD F.; RUGGELS, W. L.; JACKSON, KENNETH M.; HEFFNER, M. B. 1972. Application of Signaled Stopping Technique to Communication Research. In: Clarke, Peter, ed. New Models for Mass Communication Research. Beverly Hills, CA: Sage Publications; 1972. 5-44.

CHEN, CHING-CHIH. 1982. Citizens' Information Needs—A Regional Investigation. In: Stueart, Robert, ed. Information Needs of the 80s. Greenwich, CT: Jai Press; 1982. 77-94. ISBN: 0-89232-164-4.

CHEN, CHING-CHIH; BURGER, LESLIE B. 1984. Assessment of Connecticut Citizens' Information Needs and Library Use Study. Hartford, CT: Connecticut State Library; 1984.

CHEN, CHING-CHIH; HERNON, PETER. 1980. Library Effectiveness in Meeting Information Consumers' Needs. In: Library Administration and Management Association Library Research Round Table, ed. Library Effectiveness. Chicago, IL: Library Administration and Management Association; 1980. 49-62.

CHEN, CHING-CHIH; HERNON, PETER. 1982. Information Seeking: Assessing and Anticipating User Needs. New York, NY: Neal-Schuman Publishers, Inc. 1982. ISBN: 0-918212-50-2.

CHILDERS, THOMAS A. 1982. Personal Maintenance and Personal Growth. In: Sweeney, G. P., ed. Information and the Transformation of Society.

Amsterdam, The Netherlands: North-Holland Publishing Company; 1982. 102-113. ISBN: 0-444-86505-5.

COOPER, WILLIAM S. 1978a. The 'Why Bother' Theory of Information Usage. Journal of Informatics. 1978 April; 2(1): 2-5.

COOPER, WILLIAM S. 1978b. A Perspective on the Measurement of Retrieval Effectiveness. Drexel Library Quarterly. 1978 April; 14(2): 15-39. ISSN: 0012-6160.

CRANE, DIANA. 1971. Information Needs and Uses. In: Cuadra, Carlos A.; Luke, Ann W., eds. Annual Review of Information Science and Technology: Volume 6. Chicago, IL: William Benton; 1971. 1-39. ISBN: 0-85229-166-3.

CRAWFORD, SUSAN. 1978. Information Needs and Uses. In: Williams, Martha E., ed. Annual Review of Information Science and Technology: Volume 13. Chicago, IL: Knowledge Industry Publications, Inc.; 1978. 61-81. ISSN: 0066-4200.

CRONIN, BLAISE. 1981. Assessing User Needs. Aslib Proceedings. 1981 February; 33(2): 37-47. ISSN: 0001-253X.

CURRAN, CHARLES C. 1982. A Symposium on a Library and Information Science Research Agenda for the 1980s. Library Research. 1982 Winter; 4(4): 385-400. ISSN: 0164-0763.

D'ELIA, GEORGE P. 1980a. The Development and Testing of a Conceptual Model of Public Library User Behavior. Library Quarterly. 1980; 50(4): 410-430. ISSN: 0024-2519.

D'ELIA, GEORGE P. 1980b. User Satisfaction as a Measure of Public Library Performance. In: Library Administration and Management Association Library Research Round Table, ed. Library Effectiveness. Chicago, IL: Library Administration and Management Association; 1980. 64-73.

DAVIES, ROY. 1983. Documents, Information or Knowledge? Choices for Librarians. Journal of Librarianship. 1983 January; 15(1): 47-65. ISSN: 0022-2232.

DERR, RICHARD L. 1983. A Conceptual Analysis of Information Need. Information Processing and Management. 1983; 19(5): 273-278. ISSN: 0306-4573.

DERVIN, BRENDA. 1977. Useful Theory for Librarianship: Communication, Not Information. Drexel Library Quarterly. 1977; 13(3): 16-32. ISSN: 0012-6160.

DERVIN, BRENDA. 1980. Communication Gaps and Inequities: Moving Toward a Reconceptualization. In: Dervin, Brenda; Voigt, Melvin, eds. Progress in Communication Sciences: Volume 2. Norwood, NJ: Ablex; 1980. 73-112. ISBN: 0-89391-060-0.

DERVIN, BRENDA. 1981. Mass Communicating: Changing Conceptions of the Audience. In: Rice, Ronald; Paisley, William, eds. Public Communication Campaigns. Beverly Hills, CA: Sage Publications; 1981. 71-87. ISBN: 0-8039-1578-0.

DERVIN, BRENDA. 1983a. Information as a User Construct: The Relevance of Perceived Information Needs to Synthesis and Interpretation. In: Ward, Spencer A.; Reed, Linda J., eds. Knowledge Structures and Use: Implications for Synthesis and Interpretation. Philadelphia, PA: Temple University Press; 1983. 153-184. ISBN: 0-87722-331-9.

DERVIN, BRENDA. 1983b. An Overview of Sense-Making: Concepts, Methods, and Results to Date. Paper presented at International Commu-

nication Association Annual Meeting; 1983 May; Dallas, TX. Available: Brenda Dervin, Department of Communication, Ohio State University, Columbus, OH 43210.

DERVIN, BRENDA. 1984. The Information Needs of Californians—1984: Report #2. Davis, CA: University of California at Davis, Institute of Governmental Affairs; 1984.

DERVIN, BRENDA; DEWDNEY, PATRICIA. 1986. Neutral Questioning: A New Approach to the Reference Interview. Reference Quarterly. 1986; Fall, in press.

DERVIN, BRENDA; FRASER, BENSON. 1985. How Libraries Help. Stockton, CA: University of the Pacific, Department of Communication; 1985 October.

DERVIN, BRENDA; ZWEIZIG, DOUGLAS; BANISTER, MICHAEL; GABRIEL, MICHAEL; HALL, EDWARD P.; KWAN, COLLEEN. 1976. The Development of Strategies for Dealing with the Information Needs of Urban Residents: Phase I—The Citizen Study. 1976. (Final report on Project Number L0035JA to the U.S. Office of Education). ERIC: ED 136791.

DETWEILER, MARY JO. 1980. Availability of Materials in Public Libraries. In: Library Administration and Management Association Library Research Round Table, ed. Library Effectiveness. Chicago, IL: American Library Association; 1980. 75-83.

DUMONT, ROSEMARY RUHIG; DUMONT, PAUL F. 1979. Measuring Library Effectiveness: A Review and Assessment. Advances in Librarianship. 1979; 9: 103-141. ISBN: 0-12-785009-0.

DURRANCE, JOAN C. 1982. A Model for the Selection of Factors which Affect the Public Policy Information Needs of Citizen Groups. Library Research. 1982 Spring; 4: 23-49. ISSN: 0164-0763.

DURRANCE, JOAN C. 1984. Armed for Action—Library Response to Citizen Information Needs. New York, NY: Neal-Schuman Publishers, Inc.; 1984. ISBN: 0-918212-71-5.

EDELSTEIN, ALEX S. 1974. The Uses of Communication in Decision Making: A Comparative Study of Yugoslavia and the United States. New York, NY: Praeger; 1974. ISBN: 0-275-28779-3.

FARRADANE, JASON. 1979. The Nature of Information. Journal of Information Science. 1979 April; 1(1): 13-17. ISSN: 0165-5515.

FARRADANE, JASON. 1980a. Relational Indexing: Part One. Journal of Information Science. 1980 April; 2(1): 267-276. ISSN: 0165-5515.

FARRADANE, JASON. 1980b. Knowledge, Information, and Information Science. Journal of Information Science. 1980 September; 2(2): 75-80. ISSN: 0165-5515.

FISCHER, MARY WOOD. 1979. The Needs of Older Adults: Material and Access. Drexel Library Quarterly. 1979 April; 15(2): 20-28. ISSN: 0012-6160.

FORD, NIGEL. 1980. Relating "Information Needs" to Learner Characteristics in Higher Education. Journal of Documentation. 1980 June; 36(2): 99-114. ISSN: 0022-0418.

GARVEY, WILLIAM D.; TOMITA, KAZUO; WOOLF, PATRICIA. 1979. The Dynamic Scientific-Information User. In: Garvey, William D. Communication: The Essence of Science. Elmsford, NY: Pergamon Press; 1979. 256-279. ISBN: 0-08-022254-4.

GRUNIG, JAMES E. 1978. Defining Publics in Public Relations: The Case of a Suburban Hospital. Journalism Quarterly. 1978 Spring; 55: 109-118. ISSN: 0196-3031.

HALL, HOMER J. 1981. Patterns in the Use of Information: The Right to Be Different. Journal of the American Society for Information Science. 1981 March; 32(2): 103-112. ISSN: 0002-8231.

HAMMARBERG, ROBERT. 1981. The Cooked and the Raw. Journal of Information Science. 1981 December; 3(6): 261-267. ISSN: 0165-5515.

HEIM, KATHLEEN M. 1982. Stimulation. In: Schlachter, Gail A., ed. The Service Imperative for Libraries. Littleton, CO: Libraries Unlimited, Inc.; 1982. 120-154. ISBN: 0-87287-272-6.

HERNER, SAUL; HERNER, MARY. 1967. Information Needs and Uses in Science and Technology. In: Cuadra, Carlos A., ed. Annual Review of Information Science and Technology: Volume 2. New York, NY: Interscience Publishers; 1967. 1-34. ISBN: 85229-147-7.

HIBBERD, PATRICIA L.; MEADOWS, A. J. 1980. Use of Drug Information Sources by Hospital Doctors. Journal of Information Science. 1980 October; 2(3/4): 169-172. ISSN: 0165-5515.

HODOWANEC, GEORGE V. 1979. Library User Behavior. Collection Management. 1979 Summer-Fall; 3(2/3): 215-232. ISSN: 0146-2679.

HOLLNAGEL, ERIC. 1980. Is Information Science an Anomalous State of Knowledge? Journal of Information Science. 1980; 2: 183-187. ISSN: 0165-5515.

HORNE, ESTHER. 1983. Question Generation and Formulation: An Indication of Information Need. Journal of the American Society for Information Science. 1983 January; 34(1): 5-15. ISSN: 0002-8231.

JAMES, ROBERT. 1983. Libraries in the Mind: How Can We See Users' Perceptions of Libraries? Journal of Librarianship. 1983 January; 15(1): 19-28. ISSN: 0022-2232.

JARVELIN, KALERVO; REPO, AATTO J. 1982. Knowledge Work Augmentation and Human Information Seeking. Journal of Information Science. 1982 November; 5(2/3): 79-86. ISSN: 0165-5515.

KRIKELAS, JAMES. 1983. Information Seeking Behavior Patterns and Concepts. Drexel Library Quarterly. 1983; 19(2): 5-20. ISSN: 0012-6160.

LANCASTER, F. WILFRID. 1977. The Measurement and Evaluation of Library Services. Washington, D.C.: Information Resources Press; 1977. ISBN: 0-87815-017-X.

LANS, FRANK. 1982. Adapting to Changing User Requirements. Information and Management. 1982 June; 5(2): 59-75. ISSN: 0378-7206.

LEVITAN, KAREN. 1980. Applying a Holistic Framework to Synthesize Information Science Research. In: Dervin, Brenda; Voigt, Melvin, eds. Progress in Communication Sciences: Volume 2. Norwood, NJ: Ablex Publishing Corp.; 1980. 241-273. ISBN: 0-89391-060-0.

LIN, NAN; GARVEY, WILLIAM D. 1972. Information Needs and Uses. In: Cuadra, Carlos A.; Luke, Ann W., eds. Annual Review of Information Science and Technology: Volume 7. Washington, DC: American Society for Information Science; 1972. 1-37. ISBN: 0-87715-206-3.

LIPETZ, BEN-AMI. 1970. Information Needs and Uses. In: Cuadra, Carlos A.; Luke, Ann W., eds. Annual Review of Information Science and

Technology: Volume 5. Chicago, IL: William Benton; 1970. 1-32. ISBN: 0-85229-156-6.
LOWRY, G. R. 1979. Information Use and Transfer Studies: An Appraisal. 1979 December. 37p. ERIC: ED 211 085.
LYNCH, MARY JO. 1980. Public Library Planning: A New Approach. Library Journal. 1980 May 15; 105(10): 1131-1134. ISSN: 0000-0027.
MACMULLIN, SUSAN E.; TAYLOR, ROBERT S. 1984. Problem Dimensions and Information Traits. The Information Society. 1984; 3(1): 91-111. ISSN: 0197-2243.
MAGUIRE, CARMEL. 1981. Book Review: Hedvah L. Shuchman, Information Transfer in Engineering. Library Research. 1981 Winter; 3(4): 407-411. ISSN: 0164-0763.
MANCALL, JACQUELINE C.; DROTT M. CARL. 1979. Materials Used by High School Students in Preparing Independent Study Projects: A Bibliometric Approach. Library Research. 1979 Summer; 1(3): 223-236. ISSN: 0164-0763.
MARKEY, KAREN. 1980. Levels of Question Formulation in Negotiation of Information Need During the Online Presearch Interview: A Proposed Model. Information Processing and Management. 1981; 17(5): 215-225. ISSN: 0306-4573.
MARON, M. E. 1985. Probabilistic Retrieval Models. In: Dervin, Brenda; Voigt, Melvin, eds. Progress in Communication Sciences: Volume 5. Norwood, NJ: Ablex Publishing; 1985. 145-176. ISBN: 0-89391-010-4; ISSN: 0163-5689.
MARTYN, JOHN. 1974. Information Needs and Uses. In: Cuadra, Carlos A.; Luke, Ann W.; Harris, Jessica L., eds. Annual Review of Information Science and Technology: Volume 9. Washington, DC: American Society for Information Science; 1974. 1-23. ISBN: 0-87715-209-8.
MARTYN, JOHN; LANCASTER, F. WILFRID. 1981. Investigative Methods in Library and Information Science: An Introduction. Arlington, VA: Information Resources Press; 1981. ISBN: 0-87815-035-8.
MCMULLEN, HAYNES. 1981. Librarians and the Pursuit of Happiness. Library Journal. 1981 June; 106(11): 1172-1174. ISSN: 0000-0027.
MENDEZ, AIDA. 1984. An Analysis of Humanists' Requests Received by an Information Service for the Humanities. Journal of Information Science. 1984; 9(3): 97-105. ISSN: 0165-5515.
MENZEL, HERBERT. 1966. Information Needs and Uses in Science and Technology. In: Cuadra, Carlos A., ed. Annual Review of Information Science and Technology: Volume 1. New York, NY: Interscience Publishers; 1966. 41-69. LC: 66-25096.
MICK, COLIN K.; LINDSEY, GEORGE N.; CALLAHAN, DANIEL. 1980. Toward Usable User Studies. Journal of the American Society for Information Science. 1980 September; 31(5): 347-356. ISSN: 0002-8231.
MOHR, M. 1978. Systems Evaluation in Terms of User Needs. In: Taylor, Peter J., ed. New Trends in Documentation and Information: Proceedings of the International Federation for Documentation (FID) 39th Congress; 1978 September 25-28; University of Edinburgh, Scotland. London, England: Aslib; 1980. 352-366. ISBN: 0-85142-128-8.
MOREHEAD, JOE. 1982. User Needs and the Information Transfer Process. Microform Review. 1982 Fall; 11(4): 259-265. ISSN: 0002-6530.

NATOLI, JOSEPH P. 1982. Librarianship as a Human Science: Theory, Method, and Application. Library Research. 1982 Summer; 4(2): 163-174. ISSN: 0164-0763.
NEILL, SAMUEL D. 1982. Brookes, Popper, and Objective Knowledge. Journal of Information Science. 1982 September; 4(2): 33-39. ISSN: 0165-5515.
ODDY, ROBERT N. 1977. Information Retrieval through Man-Machine Dialogue. Journal of Documentation. 1977 March; 33(1): 1-14. ISSN: 0022-0418.
OFORI-DWUMFUO, G. O. 1982. Reference Retrieval without User Query Formulation. Journal of Information Science. 1982 May; 4(2/3): 105-110. ISSN: 0165-5515.
PAISLEY, WILLIAM. 1968. Information Needs and Uses. In: Cuadra, Carlos A., ed. Annual Review of Information Science and Technology: Volume 3. Chicago, IL: William Benton; 1968. 1-30. ISBN: 0-87815-035-8.
PAISLEY, WILLIAM. 1980. Information and Work. In: Dervin, Brenda; Voigt, Melvin, eds. Progress in Communication Sciences: Volume 2. Norwood, NJ: Ablex Publishing; 1980. 113-166. ISBN: 0-89391-060-0.
PALMOUR, VERNON E.; BELLASSAI, MARCIA C.; DEWATH, NANCY V. 1980. A Planning Process for Public Libraries. Chicago, IL: American Library Association; 1980. ISBN: 0-8389-3246-0.
PALMOUR, VERNON E.; RATHBUN, PATRICIA F.; BROWN, WILLIAM H.; DERVIN, BRENDA; DOWD, PATRICIA M. 1979. Information Needs of Californians. Rockville, MD: King Research, Inc., 1979 March. (Technical Report to California State Library).
ROBERTSON, STEPHEN E. 1977. Theories and Models in Information Retrieval. Journal of Documentation. 1977 June; 33(2): 126-148. ISSN: 0022-0418.
RUDD, DAVID. 1983. Do We Really Need World III? Information Science With or Without Popper. Journal of Information Science. 1983 October; 7(3): 99-105. ISSN: 0165-5515.
SELL, BETTY. 1980. An Evaluative, Holistic, and User-Oriented Approach to Assessing and Monitoring Effectiveness of the Academic Library in Its Setting. In: Library Administration and Management Association Library Research Round Table, ed. Library Effectiveness. Chicago, IL: Library Administration and Management Association; 1980. 295-336.
SHINEBOURNE, J. 1980. User Needs, the New Technology and Traditional Approaches to Library Services. Journal of Information Science. 1980 October; 2(3/4): 135-140. ISSN: 0165-5515.
SINGH, R. S. 1981. Information Resources, Services and Information Needs in Chemistry and Chemical Technology in India: A Survey. Annals of Library Science and Documentation. 1981 March-December; 28(1-4): 42-49. ISSN: 0003-4835.
STAMM, KEITH R.; GRUNIG, JAMES E. 1977. Communication Situations and Cognitive Strategies in Resolving Environmental Issues. Journalism Quarterly. 1977 Winter; 54: 713-720. ISSN: 0196-3031.
STEVENSON, GORDON. 1978. The Public Library in a Communications Setting. Library Quarterly. 1978; 48(4): 393-415. ISSN: 0024-2519.
STIEG, MARGARET. 1981. The Information Needs of Historians. College and Research Libraries. 1981 November; 42: 549-560. ISSN: 0010-0870.

STONE, SUE. 1982. Humanities Scholars: Information Needs and Uses. Journal of Documentation. 1982 December; 38(4): 292-313. ISSN: 0022-0418.

SUMMERS, E.; MATHESON, J.; CORNY, D. 1983. The Effect of Personal, Professional, and Psychological Attributes and Information Seeking Behavior on the Use of Information Sources by Educators. Journal of the American Society for Information Science. 1983 January; 34(1): 75-86. ISSN: 0002-8231.

SUMMERS, G. 1981. Medical School Faculty and Their Libraries: An Evaluative Study. Journal of Medical Education. 1981 May; 56(5): 440-442. ISSN: 0022-2577.

SWIFT, D. F.; WINN, V. A.; BRAMER, D. A. 1979. A Sociological Approach to the Design of Information Systems. Journal of the American Society for Information Science. 1979 July; 30(4): 215-223. ISSN: 0002-8231.

TAYLOR, ROBERT S. 1962. The Process of Asking Questions. American Documentation. 1962; 13: 391-396. ISSN: 0002-8231.

TAYLOR, ROBERT S. 1968. Question-Negotiation and Information Seeking in Libraries. College and Research Libraries. 1968; 29: 178-194. ISSN: 0010-0870.

TAYLOR, ROBERT S. 1984. Value-Added Processes in Document-Based Systems: Abstracting and Indexing Services. Information Services and Use. 1984 June; 4(3): 127-146. ISSN: 0167-5265.

TAYLOR, ROBERT S. 1985. Information Values in Decision Contexts. Information Management Review. 1985; 1(1): 47-55.

TOBIN, JAYNE C. 1975. A Study of Library "Use Studies." Information Storage and Retrieval. 1974; 10: 101-113. ISSN: 0020-0271.

VERMUELEN, C. H. 1981. What about the Non-Users of the Public Library? South African Journal for Librarianship and Information Science. 1981 July; 49(2): 10-14. ISSN: 0038-240X.

WARNER, EDWARD S.; MURRAY, ANNE D.; PALMOUR, VERNON E. 1973. Information Needs of Urban Residents. Final report on Contract No. OEC-0-71-4555 to U.S. Office of Education; 1973 December. Available from: Brenda Dervin, Department of Communication, Ohio State University, Columbus, OH 43210.

WERSIG, GERNOT; WINDEL, G. 1985. Information Science Needs a Theory of "Information Actions." Social Science Information Studies. 1985 January; 5(1): 11-23. ISSN: 0143-6236.

WHITE, HERBERT. 1980. Library Effectiveness—The Elusive Target. American Libraries. 1980 December; 11: 683. ISSN: 0002-9769.

WILLIAMS, PATRICK. 1983. Double Fault: A Critique of a Planning Process for Public Libraries. Library Quarterly. 1983; 53(4): 448-455. ISSN: 0024-2519.

WILLIAMSON, N.J. 1981. Viewdata Systems: Designing a Database for Effective User Access. Canadian Journal of Information Science. 1981 June; 6: 1-14. ISSN: 0380-9218.

WILSON, PATRICK. 1978. Some Fundamental Concepts of Information Retrieval. Drexel Library Quarterly. 1978 April; 14(2): 10-24. ISSN: 0012-6160.

WILSON, PATRICK. 1983. Second-Hand Knowledge: An Inquiry into Cognitive Authority. Westport, CT: Greenwood Press; 1983. ISBN: 0-31323-763-8.

WILSON, THOMAS D. 1981. On User Studies and Information Needs. Journal of Documentation. 1981 March; 37(1): 3-15. ISSN: 0022-0418.

WILSON, THOMAS D. 1984. The Cognitive Approach to Information Seeking Behavior and Information Use. Social Science Information Studies. 1984 July; 4(2/3): 197-204. ISSN: 0143-6236.

WILSON, THOMAS D.; STREATFIELD, D. R. 1977. Information Needs in Local Authority Social Services Departments: An Interim Report on Project INISS. Journal of Documentation. 1977; 33: 277-293. ISSN: 0022-0418.

WILSON, THOMAS D.; STREATFIELD, D. R.; MULLINGS, C. 1979. Information Needs in Local Authority Social Services Departments: A Second Report on INISS. Journal of Documentation. 1979 June; 35(2): 120-136. ISSN: 0022-0418.

WOOD, FRANCES E. 1985. The Use and Availability of Occupational Health Information: Results of a Study. Journal of Information Science. 1985; 9(4): 141-151. ISSN: 0165-5515.

WOOSTER, HAROLD. 1979. The Users Last. Bulletin of the American Society for Information Science. 1979 August; 5(6): 19-21. ISSN: 0095-4403.

ZWEIZIG, DOUGLAS. 1979. Approaches to the Study of Public Library Services and Users: The Recommendations of a Study Panel to the National Center for Education Statistics. Public Library Quarterly. 1979; 1: 258-266. ISSN: 0161-6146.