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Conceptual Frameworks in Information Behavior

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INTRODUCTION

This chapter traces major conceptual developments in the information behavior literature since the user-centered paradigm shift observed by DERVIN & NILAN in 1986. In their landmark *ARIST* review, Dervin and Nilan emphasized calls in the post-1978 literature for conceptual enrichment within the field. Acknowledging that research studies have not informed practice, they noted calls for borrowing theory from the social sciences, for developing theories and conceptual frameworks, for examining basic assumptions and definitions, and for improving the predictive value of theory. They followed their insightful observation of a paradigmatic shift from a system/resource approach to an alternative one, characterized by its focus on constructive, active users, subjective information, situationality, holistic views of experience, internal cognition, systematic individuality, and qualitative research with three examples of scholarship that represent promising roads—namely, the user-values or value-added approach of TAYLOR (1984; 1985) and MACMULLIN & TAYLOR, the Sense-Making approach of DERVIN (1999a), and the anomalous-states-of-knowledge (ASK) approach of BELKIN ET AL. (1982a; 1982b). Documenting the field's quantum and revolutionary conceptual leap and achievement of critical mass, they challenged researchers to continue inventing new ways of looking at users and linking systems to them (DERVIN & NILAN, p. 24).

As HEWINS confirmed in her 1990 *ARIST* review, there is little doubt that a user-centered approach to studying information behavior has pervaded the literature and has begun underscoring the design and management of information systems. She also remarked on the prevalence of the cognitive approach for framing information behavior prob-

lems, but have we invented new approaches to understanding users and systems? What roads have we taken toward developing a theoretical core complete with common assumptions and definitions and improved predictive value? In this chapter we review advancements in the development of conceptual frameworks for studying information behavior.

Conceptual development and research interest in information behavior is undoubtedly increasing. Since 1996 three conferences in the series INFORMATION SEEKING IN CONTEXT were held in Europe (Tampere, Finland, 1996; Sheffield, United Kingdom, 1998; and Göteborg, Sweden, 2000), and a fourth is planned for Edinburgh in 2002. In addition to drawing researchers from throughout the world, the conference series emphasizes doctoral research and holds a preconference workshop where students gain critical feedback on their dissertations from established scholars. In 1999, the American Society for Information Science (ASIS) established a special interest group entitled "Information Needs, Seeking, and Use" (SIGUSE). In 1999 the journal *Information Processing & Management* published a special issue on "Information Seeking in Context," which was guest edited by KUHLTHAU & VAKKARI. A special issue on everyday-life information seeking, which is being edited by Charles Cole and Amanda Spink, is scheduled for 2001 in the journal *Library & Information Science Research*.

While WILSON (1997; 1999a; 1999b; 2000) recently published several seminal overviews of information behavior, debate lingers over whether "information behavior" is an appropriate term for describing a body of academic study. In December 1999 subscribers of the listserv JESSE debated whether one should use the term information behavior to refer to the study of information seeking and use. Arguments for using the term were based largely on observations that the field has broadened to include such concepts as information need and information giving, in addition to the basic concepts of information seeking and information use. Others argued that the term information behavior is inappropriate because people outside the field might associate it too closely with the behaviorist paradigm in psychology and thus not consider the broad range of contextual factors of interest to information behavior research. Others further asserted that the term information behavior is incorrect, grammatically speaking, because information does not behave; only people do. The term, however, seems to have received general acceptance as it is now widely used in the titles of journal articles and academic courses. While researchers use various definitions of information behavior, for our purposes we define it as the study of how people need, seek, give, and use information in different contexts, including the workplace and everyday living. This definition is consistent with Wilson, who defines information behavior as "the totality of human

behavior in relation to sources and channels of information, including both active and passive information seeking, and information use" (WILSON, 2000, p. 49). According to Wilson, information-seeking behavior, information searching behavior, and information use behavior are subcategories of information behavior.

WHERE'S THE THEORY?

While bibliometric studies largely suggest that information science (IS), in general, is atheoretical, with theory mentioned in only 10–21% of the journal literature (FEEHAN ET AL.; JÄRVELIN & VAKKARI, 1990; NOUR; PERITZ), interesting variations occur if one considers only the information behavior literature. JULIEN, for example, in her study of the 1990–1994 journal literature, reported that 28% of the 165 articles sampled were theoretically grounded, meaning they were "based on a coherent and explicit framework of assumptions, definitions, and propositions that, taken together, have some explanatory power" (JULIEN, p. 56). However, in a related study, JULIEN & DUGGAN reported that of the 300 research studies sampled from 1984–1989 and 1995–1998 only 18.3% were based on theory, which they considered very low. Yet, their results do suggest that theory use may be increasing, given the finding of JÄRVELIN & VAKKARI (1993) that only 6–8% of research articles on information seeking sampled for the years 1965, 1975, and 1985 employed a conceptual framework. Julien also reported significant relationships regarding author type and journal type where both researchers and scholarly journals (as opposed to practitioners and professional journals) were more likely to produce or contain theoretically grounded publications.

Most recently, evidence of an increase in the use of conceptual frameworks within information behavior research was discussed by other authors. With regard to IS overall, PETTIGREW & MCKECHNIE reported that theory was discussed in 34.1% of the 1,160 articles published between 1993 and 1998 in six key journals, which is a substantial increase from the 10–21% reported in past studies. Their examination of different subfields revealed that studies of information behavior ranked second, after those about information science in general, in the degree to which authors discussed theory. Of the 95 information behavior papers examined, 58.9% used theory with 1.99 theory incidents per article. When only those articles using theory were considered, the average theory occurrence within the information behavior subset rose to 3.37. In a related work, MCKECHNIE ET AL. reported that the vast majority of theories cited in information behavior research were from the social sciences (64.4%), followed by information science (28.7%), the natural sciences (5.9%), and the humanities (1.0%) (similar results were

found for IS in general). The prevalent use of social science theory suggests that researchers embraced Dervin and Nilan's earlier suggestion. Of particular interest is that new information behavior theories were proposed by 15 authors. However, their citation analysis of the two most frequently cited information behavior theories—Kuhlthau's information search process and Dervin's Sense-Making approach—suggests that information behavior theories have not yet had much impact outside information science. They concluded that substantive theoretical work is being undertaken within information behavior and that a paradigmatic core is showing early signs of maturation (KUHLETHAU; DERVIN, 1999a).

This chapter reviews these new developments in three sections: 1) Cognitive Approaches covers those that examine the individual as the main driving force behind information behavior; 2) Social Approaches examines frameworks that focus on the social context; and 3) Multifaceted Approaches deals with those that consider multiple types of context, such as the cognitive, social, and organizational context.

COGNITIVE APPROACHES

In 1986 when Dervin and Nilan published their review of the literature on "Information Needs and Uses," the authors noted a "call for focusing on cognitive behavior and developing cognitive approaches to assessing information needs and uses" (DERVIN & NILAN, p. 15). Since the mid 1980s numerous researchers have identified themselves with the cognitive viewpoint and in so doing, have provided a new focus for developments in theory and concept definition for the discipline of information science. Research has occurred in a number of fields within the discipline but an area fundamentally affected by this orientation over the past decade is information behavior.

Not all researchers share precisely the same definition of the cognitive viewpoint, but there is, as Belkin has suggested, a kernel of meaning that is common to most. The essence of the viewpoint and its importance to information research is that it "... explicitly considers that the states of knowledge, beliefs and so on of human beings (or information processing devices) mediate (or interact with) that which they receive/ perceive or produce" (BELKIN, pp. 11-12).

For the purposes of this ARIST review, therefore, the cognitive viewpoint is defined as an approach and set of constructs for understanding information behavior, which focuses fundamentally upon attributes of the individual. This view of information behavior endorses research that examines the cognitive and emotional motivations for information behavior that carry across contexts or are independent of context. The cognitive viewpoint does not study the context of information behavior

and is in this way distinguished from the social cognitive (discussed later in this review) where context (particularly attributes of the social and organizational context) becomes the focus for understanding information behavior.

At the heart of the cognitive viewpoint rests the concept of knowledge structures. This concept has been borrowed from the cognitive sciences. Knowledge structures are the sets of concept relationships that comprise each individual's model of the world. It is this model of the world that is seen to mediate an individual's information behavior. Each person will apply the knowledge structures that are required to perceive, interpret, modify, or transfer information. Information behavior research from the cognitive viewpoint acknowledges the thesis that "... any processing of information—whether perceptual (such as perceiving an object) or symbolic (such as understanding a sentence)—is mediated by a system of categories or concepts, which for the information processor, constitutes a representation or a model of his world" (DE MEY, p. 4). Information behavior research that applies the cognitive viewpoint is therefore interested in studying how an individual will apply his or her model or view of the world to the processes of needing, seeking, giving, and using information.

Much credit for transforming our understanding of the trigger to information behavior (information need), from an abstract concept that can be clearly articulated by the information user and systematically interpreted by the information mechanism to an intrinsic and somewhat unspecifiable anomaly in the user's model of the world, has been attributed to TAYLOR (1968). His model, though not explicitly identified as such, can be seen as a cognitive approach inasmuch as it is concerned with notions of "incompleteness in [the user's] picture of the world" and an implied tendency on the part of the user toward "cognitive consistency or balance." It is therefore cited in the work of those who explicitly identify their orientation with the cognitive viewpoint. In information behavior research, the cognitive viewpoint focuses fundamentally upon the individual, on understanding the way each person thinks and behaves in response to information needs.

By the end of the 1980s where the focus of this review begins, numerous examples of information research focused on the user as an individual, cognitive being and on the behaviors associated with information processing. The theoretical framework, called the cognitive viewpoint, and the focus on the individual as a unique information user was well accepted and widely applied, leading Belkin to state that there was strong evidence to support the claim that "... taking the cognitive viewpoint of information science can lead to highly beneficial results, in a variety of areas. . . ." (BELKIN, pp. 14-15). Belkin further speculated, "... the cognitive viewpoint might serve as a

means for integrating and relating work in a variety of areas of information science to one another, and therefore provide the structure for a unified and effective information science" (BELKIN, pp. 14-15).

To some extent, Belkin's statements have proved prophetic. The 1990s application of the cognitive viewpoint in terms of information behavior research has been characterized by an increased awareness among information researchers that more explicit statements regarding the theoretical orientation of the work being undertaken will enhance research in the discipline. In this way, we see numerous studies in which researchers promote the cognitive approach to studying information behavior by explicating the scope of their study within this construct.

This research has focused on the information user as a unique individual but has also sought to identify patterns in information behavior that can be applied to the development of information retrieval systems. The work of ELLIS, appearing at the very end of the 1980s, is an example. Ellis examined the information-seeking behavior of academic social scientists working at the University of Sheffield and identified six characteristics that he claims can provide a basis for system design and evaluation. The six features of the model he called starting, chaining, browsing, differentiating, monitoring, and extracting. Starting is looking for information in a new area or on a new topic. Chaining is searching using the technique of following citation connections between materials. Differentiating is selecting information sources based on their orientation and the audience for whom the source was intended. Monitoring refers to the continuous surveying of the developments in a field of study. Extracting is the behavior of going through a particular source selectively to identify relevant material from that source. Ellis explained in detail how each of these six features of his model could be used in connection with the design and evaluation of information systems.

The importance of Ellis's work from a cognitive point of view is that it reinforces the individual way in which these features can interact for any person seeking information. These interactions will depend, in Ellis's view, on unique attributes of the individual seeking information at a particular point in time. Ellis based his model of information seeking on his observations of people engaged in literature searching. We now know that the 1990s became the era of Web searching. This led CHOO ET AL. to reexamine and to extend the Ellis model in light of any new attributes to individual searching of information that may have emerged. The researchers worked with Ellis's generic features (starting, chaining, browsing, differentiating, monitoring, and extracting) to elaborate what happened within each feature when an individual searched the Web. Each of these characteristics of information seeking on the

Web was then related to scanning modes or motivations (undirected viewing, conditioned viewing, informal search, and formal search) that had first been formulated by AGUILAR. Choo et al. gathered data from 34 participants from seven companies using a questionnaire survey, a Web tracker application, and a personal interview. They identified and categorized 61 information-seeking episodes, which were then analyzed according to where they might fit on the framework created by cross tabulating Ellis's generic information-seeking features with Aguilar's formulation of search modes. They found the framework effective as a tool for analyzing and elaborating the Web searching behavior of individuals. They also found that data from their sample of searchers indicated that searching modes are characterized by particular features: information seeking motivated by undirected viewing commonly applies differentiating and browsing; conditioned viewing results in differentiating, browsing, and monitoring; informal searches use differentiating and localized extracting; and formal searches apply thorough extracting.

A landmark study published at the beginning of the 1990s by KUHLETHAU also set the scene across the decade for researchers within the cognitive framework. Kuhlthau's work represented a culmination of earlier research with collaborators Turock and Belvin (KUHLETHAU ET AL.) on facilitating information seeking through cognitive models of the search process. The study incorporated the theories of Kelly (personal construct theory), Taylor (levels of need), and Belkin (ASK hypothesis, based on the cognitive view of information seeking) to formulate a model of the information search process. This model presented three realms of activity—physical, affective, and cognitive—and was based on five studies conducted by Kuhlthau. The first of these studies was small in scale and in a naturalistic setting. This study was followed by two longitudinal studies and two quantitative studies. The studies covered a range of users, including college students, secondary school students, and public library users.

Kuhlthau identified six stages in the information search process, incorporating the attributes of feelings, thoughts, and actions for the individual information searcher into each stage. The first stage of the information search process is initiation, where the individual is confronted with the task of recognizing his or her need for information. Then follows selection, where the task is to identify and to select the general topic to be investigated. The third stage of Kuhlthau's model is exploration, where the information searcher is attempting to extend his or her understanding by exploring information on the general topic of the search. The fourth stage is formulation. The task is to form a focus from the information that the searcher has thus far encountered in the searching process. The next stage is collection, when the searcher be-

gins to gather information from the system being searched related to the focused topic. The information search process is completed by the stage of presentation. Here the findings or outcomes of the search are used. The importance of Kuhlthau's model to the cognitive approach to studying information behavior is its explication of the various attributes of the individual that correspond to each stage of the search process but are independent of context. The feelings of uncertainty, confusion, optimism, frustration, relief, and satisfaction cut across searching context. Each is also a fundamentally unique response by an individual, at a point in time, engaging in a particular information-seeking episode.

Kuhlthau's work was widely cited by information behavior researchers through the 1990s. Building on Kuhlthau's work on uncertainty, for example, YOON & NILAN advocated a cognitive-linguistic framework that utilizes Dervin's Sense-Making approach for understanding the exchange of meaning within information behavior. VAKKARI (2000) also validated and elaborated Kuhlthau's model through his investigation of the information behavior of students writing a research proposal for a master's thesis. He found that Kuhlthau's model predicted the information behavior of the students that he observed in his study. The students in his sample followed the stages in Kuhlthau's model of the search process.

Kuhlthau was attempting to capture the whole experience of the information seeker and so, too, was BROWN. She used an organizational and behavioral framework for her model and identified three dimensions of information-seeking behavior that she found in the literature: the conditions, the context, and the process. The model presented attempted to display the interaction among these dimensions. The conditions of information behavior were exposure and discrimination (evaluation). Exposure refers to individuals' constantly being subjected to stimuli that, depending on strength or pertinence, may achieve sensory registration. Not all information is processed. The individual brain needs a medium level of arousal for information reception to occur. Once this information (stimulus) has gained cognitive attention, it becomes thoughts that can be used immediately or held for later evaluation and use. The context of information-seeking behavior that Brown represented as the backbone of her model consists of attributes of the individual information seeker (the self, role, and environment). The context is the backdrop against which the researcher observes individual information behaviors. It is not the object of study. The central element of the context in Brown's model was the individual's self, that is, the individual physiological, affective, and cognitive needs of the user. For Brown, the beginning point in the process of information seeking is the cognitive state arising from the preconceived need. The individual then enters a process of need evaluation, whereby the

need is recognized as satisfied, or a gap is realized. The decision to search for information involves identifying where to seek information and how to seek it (source preference, searching behaviors, and searching strategies). Brown also reviewed a range of barriers that the individual confronts when engaging in information behavior, such as organizational structure, the physical environment, organizational function, personality, and imposed search strategies.

Brown's model fits the cognitive framework for this review because it focuses on the individual and explains manifestations of information behavior according to individual attributes both cognitive and affective. It follows that these attributes develop and change as a person grows older. Brown, therefore, claimed that information seeking as a behavior develops and improves throughout an individual's life in response to the changes that occur in the attributes that affect an individual's information behavior. This view of information seeking as a learning process or development process for the user also appears in BRUCE. Bruce explored techniques for observing and measuring what individuals think as well as what they do when searching for the information that they need. One of the key criticisms of information behavior research that focuses on individuals is that this cannot be achieved systematically. The general category for this criticism in Dervin and Nilan's review referred to research on the individual as chaotic. Bruce attempted to formulate techniques that could address this criticism. His study applied the cognitive viewpoint in IS as a conceptual framework for exploring the dynamism of relevance estimation by individual users as they moved from needing information (the problem state) to finding and using information (problem resolution). Bruce introduced the technique of magnitude estimation to map data representing the knowledge structures that subjects used for relevance estimation at various points in the information-seeking process observed.

YERBURY & PARKER also attempted to tap into the cognitive structures of individuals as they search for information. In this case the researchers focused on the behavior of information searching by individuals who were novices or inexperienced. The construct of information searching that they proposed modeled information searching as interpersonal communication. The researchers viewed information searching as a communication between the individual searcher and the information services used and the resources evaluated. Therefore, they used a talk-through protocol to observe how individuals use "familiar structures" to facilitate their information searching. The familiar structures that were revealed were metaphors. Yerbury and Parker found that individuals used metaphor to help them deal with the unknown or unfamiliar through credible association. Other researchers have used credible association more as a mechanism for labeling or characterizing

information-seeking behaviors. SANDSTROM, for example, proposed an optimal foraging approach to understanding information behavior that was based on evolutionary ecology. Her behaviorist approach advocated using both bibliometric and ethnographic methods for studying the decision-making processes of scholars. BATES (1989) also employed an ecological theme in her berrypicking model that characterizes how users search online and in other environments. Challenging the classic model of information retrieval, Bates argued that the search process is best characterized as evolving, that is, users search for information a "bit-at-a-time" using various techniques such as chaining and scanning. Bates's model has been widely cited in the literature, and she has offered many concrete suggestions for how it might be implemented to improve the design of information retrieval systems.

COLE was also interested in identifying patterns in the cognitive activity that occurs for individuals during the information-seeking process. His research built on the work of Kuhlthau, Belkin, and Dervin. The basic assumption of his study was that information is subjectively constructed by each individual, a piece at a time (rather like Bates's "bit-at-a-time"). He proposed a five-stage model of the information process based on data that he collected from 45 doctoral students: stage 1: opening of information process; stage 2: representational (cognitive) activity; stage 3: corroborating evidence sought and found; stage 4: closing of process; and stage 5: effect of process. Cole saw a progression of awareness or consciousness of "information" occurring for the individual information seeker as each stage of the information-seeking process is completed. The outcome of this process is that the individual's knowledge structure(s) are modified. Cole also introduced a notion of stage zero, an initiating condition that is preawareness. The notion of gap as a trigger to information behavior was discussed, but the data gathered from the sample used in this study also suggested that there may be a threshold or optimal size of gap that triggers sufficient level of awareness to warrant action by the individual searcher. This is supportive of one of the general conditions for information-seeking behavior identified in Brown's model and discussed earlier in this review—optimal arousal for information reception.

The research of VAKKARI (1999) also focused on the conditions that arouse information behavior—attributes of an individual's perception of the information problems to be resolved. He linked information behavior to task complexity and the structure of the problem an individual is attempting to deal with. Vakkari examined information actions in work environments but did not take into account actual features of the work environment. The keys for Vakkari were: task complexity, which was the degree of predeterminability of the task to be performed by the individual; problem structure, which related to how

well the information requirements and desired outcomes were known; and prior knowledge. He also emphasized the importance of the integration of new observations or information with prior knowledge.

Many of the authors we cite in this section were attempting to provide a model of information behavior based on research observations of individuals but generalizable across contexts. At the end of the 1990s WILSON (1999b) consolidated a number of these models in an attempt to present his own revised model of information behavior, which is a nested model. Wilson identifies information behavior as a general field of investigation; information-seeking behavior is then seen as a subset of this field while information search behavior is seen as a subset of information-seeking behavior. Like others who apply the cognitive viewpoint, Wilson attempted to articulate those attributes of the individual that explain information behaviors independent of variations in context. Wilson also introduced three theoretical perspectives that may be useful for the modeling of information behavior: stress/coping theory, risk/reward theory, and social learning theory. He saw human communication behavior as the way to understanding the cognitive dimensions of information behavior.

In contrast, ERDELEZ focused on accidental information discovery rather than on directed information seeking. She coined the term information encountering to describe the distinctive type of information acquisition that can occur when an individual is browsing or scanning the information environment (undirected viewing). The researcher used an exploratory research design (qualitative data collection—survey and in-depth interviewing) to explore the characteristics of information encountering according to: (1) the individual who encountered information, (2) the environment in which information was encountered, (3) the information that was encountered, and (4) the information need addressed with information that was encountered. She studied the individual behavioral, cognitive, and affective elements of the information encountering experienced by an individual. Erdelez found that information encountering was an integral part of the browsing and information-seeking activities performed by her study respondents. She categorized her subjects as superencounterers, encounterers, occasional encounterers, and nonencounterers. The key characteristic of information encountering is, of course, that it is an entirely random and unpredictable information behavior.

The work of information behavior researchers identified with the cognitive approach has therefore focused on explaining variations in information behavior according to characteristics or attributes of the individual and of the processes in which the individual is involved. Over the past decade, this body of work has contributed to our understanding of information need and use. A number of researchers have

attempted to generalize from observations of individuals or groups of individuals (researchers, students, scholars, library users). These attempts have resulted in models of the information-seeking process that are context-independent. Where the environment or situation is mentioned, the term categorizes aspects or attributes of the individual's self rather than the social, professional, or information-seeking setting. This body of research reveals that there is an individual readiness to engage in information-seeking behavior that depends on various preconditions associated with a person's level of information arousal. It describes and analyzes a range of cognitive conditions and emotional responses that arise when people engage in information behavior. It also confirms that information-seeking behavior is a process or set of processes or stages that an individual moves through in space and time and that there are reliable methods for mapping these processes and observing the variations and consistent patterns of behavior that emerge.

SOCIAL APPROACHES

Approaches to studying information behavior that focus on social contexts emerged slowly during the early 1990s and are becoming increasingly prominent. With their focus on the meanings and values associated with social, sociocultural, and sociolinguistic aspects of information behavior, studies based on social frameworks tend to employ naturalistic approaches, which have gained popularity within information behavior in general (FIDEL; WESTBROOK). Unlike behaviorist frameworks, which tend to objectify context by evoking and describing it as distinct, factual entities that are separate from the object of study, social frameworks consider context interpretively and holistically and consider it a "carrier of meaning" (TALJA ET AL., p. 752). In this sense, social approaches were developed to address information behavior phenomena that lie outside the realm of cognitive frameworks.

At the forefront of this shift in focus from primarily cognitive factors to social, cultural, and affective ones is the work of CHATMAN (2001). She developed three frameworks for studying information behavior: (1) theory of information poverty, (2) theory of life in the round, and (3) theory of normative behavior.

Chatman's theory of information poverty arose from several ethnographic studies that she conducted during the late 1980s and early 1990s (CHATMAN, 1996; 2001). For these studies she borrowed several theories from the social sciences to study everyday information flow in different small-world settings: diffusion theory and opinion leadership to study the working poor (1985; 1987b); alienation theory and gratification theory to study female janitors at a large university (1987a; 1990; 1991b); and social network theory to study elderly women residing in a

retirement complex (1991a; 1992). Four key concepts—deception, risk taking, secrecy, and situational relevance—emerged repeatedly in Chatman's research, which formed the basis of her theory of information poverty. According to Chatman, people live in an impoverished world when they choose to ignore information despite knowing that it might be helpful for dealing with daily concerns and problems. To maintain an impression of coping well within their life worlds, individuals engage in self-protective behaviors, which form the boundaries of their world of poverty. In this sense, the theory explains how individuals define and use their life experiences to survive in a world of great distrust. It reveals situations in which people know that important, relevant, and potentially useful information exists but high social and other costs prompt them to ignore it.

In her keynote address at the 2000 conference on Information Seeking in Context in Göteborg, Sweden, CHATMAN (2001) explained how two other concepts, social norms and self-protective behaviors, emerged from her early studies. Her analysis of the information behavior of female inmates in a maximum security prison—another small-world setting—revealed a third concept: worldview (in the sense of CRESSEY regarding the taxi-dance hall). Together these three concepts, social norms, self-protective behaviors, and worldview, form the basis of Chatman's theory of life in the round (1999; 2001). It describes a dynamic world based largely on approximation where "members move in and out of the round depending on their need for more systematic, precise and defined information."¹

Although this world contains an enormous degree of imprecision, it is also characterized by "surprisingly, accepted levels of uncertainty." Chatman's theory of life in the round comprises six propositions, two of which state that people will not cross boundaries of their small worlds to seek information and that people will only cross information boundaries when information is perceived as critical, the information is collectively perceived to be relevant, and a perception exists that life in the round is no longer functioning (CHATMAN, 2001). In essence, life in the round adversely affects information seeking for day-to-day situations because people will not search for information if there is no need to do so. Small-world inhabitants will choose to ignore information if they perceive that their world is working without it, that is, they have enough certainty, comfort, and situation predictability that the need to seek information is negated.

In her latest framework, theory of normative behavior, CHATMAN (2001) focused on how the everyday reality of people sharing a similar cultural space is characterized by common or routine events. The theory

¹Chatman, Elfreda A. Personal communication, 8 December 2000.

has four concepts: social norms, social types, worldview, and information behavior (defined as states in which one may or may not act on received information). According to Chatman's thesis statement, normative behavior comprises that which is viewed by inhabitants of a social world as most appropriate within a particular public context or situation. Through social norms, normative behavior dictates a predictable, routine, and manageable approach to everyday reality. In this sense, it contains the lessons that one must learn to cope successfully in a particular social world. Of interest to information behavior research are those aspects of normative behavior that embody social existence by legitimizing and justifying social values. The theory's five propositional statements are:

- Proposition 1. Social norms are standards with which members of a social world comply in order to exhibit desirable expressions of public behavior;
- Proposition 2. Members choose compliance because it allows for a way by which to affirm what is normative for this context at this time;
- Proposition 3. Worldview is shaped by the normative values that influence how members think about the ways of the world. It is a collective, taken-for-granted attitude that sensitizes members to be responsive to certain events and to ignore others;
- Proposition 4. Everyday reality contains a belief that members of a social world do retain attention or interest sufficient enough to influence behavior. The process of placing persons in ideal categories of lesser or greater quality can be thought of as a social typification;
- Proposition 5. Human information behavior is a construct in which to approach everyday reality and its effect on actions to gain or to avoid the possession of information. The decision on the appropriate course of action is driven by what members' beliefs are necessary to support a normative way of life.

Within this framework, individuals strive to represent a positive social type that shares the collective worldview and respects the social norms upheld by other members of the social world. One's efforts at creating and maintaining this social type will affect whether and how one engages in information seeking. If a situation requires information behavior that is inconsistent with the established worldview or contradicts the social type one has established, then the individual is likely

either to avoid or to disengage in information seeking or to move to another social world where he or she can engage in the behavior more freely.

Due to the recent publication of her frameworks, Chatman's conceptual contributions to the study of information behavior are only beginning to emerge. With their focus on the social aspects of everyday situations, it is expected that her frameworks will be tested widely in a variety of settings. Most recently, her theory of normative behavior was used as a framework by BURNETT ET AL. on small-world information behavior within virtual communities and of feminist booksellers.

Beyond Chatman, the influence of social science theory on the development of social frameworks for information behavior is also seen in the work of TUOMINEN & SAVOLAINEN. Using a social constructionist approach, they developed a framework for studying the concept of "information use" as a form of discursive action. Focusing on everyday settings, they followed HARRÉ's social constructionist tenet that "the primary human reality is persons in conversation" (TUOMINEN & SAVOLAINEN, p. 81). In essence, instead of viewing information as an entity with fixed boundaries or as a commodity that is transferred through communication, they defined information as "a communicative construct which is produced in a social context" (TUOMINEN & SAVOLAINEN, p. 89). As they further explain: "the contextual nature of information means that the way in which a version of information is constructed always depends on the interactive nature or argumentative context of talk, as well as on the pragmatic social purposes this version is designed to accomplish" (TUOMINEN & SAVOLAINEN, p. 89). In their framework, the study of information use cannot be considered in terms of an isolated individual or outside a specific context. Instead, it must focus on the social context, interaction, and discourse through which the sharing of information occurs. They criticized earlier definitions of information because they enabled researchers to address only such "use" questions as how frequently particular sources are consulted for information over specific time periods. Alternative forms of use, such as clarifying a situation or receiving comfort in knowing help is available, were not conceptualized in such restrictive definitions. Another tenet of social constructionism implicit in Tuominen and Savolainen's definition of information is that people "construct versions of reality between [them]selves and that knowledge is something people do together rather than [as] an individual possession" (TUOMINEN & SAVOLAINEN, p. 83). They asserted that this socially and dialogically oriented approach to studying information flow is also supported by HJØRLAND & ALBRECHTSEN, ROSENBAUM, TALJA and TAYLOR (1991), and in particular by DERVIN (1994) in her work

on communitarianism. DEWDNEY & MICHELL and SOLOMON (1997a) also commended the use of sociolinguistic approaches for studying information behavior.

PETTIGREW (1999; 2000) used Tuominen and Savolainen's information use as social-discursive action framework to derive her notion of an information ground. Using an ethnographic approach, she studied the flow of human services information (HSI) among nurses and the elderly at community foot clinics. HSI was defined as "a communicative construct involving the nature or availability of local services and programs that is produced in a social community-based context" (PETTIGREW, 1999, p. 811). Implicit in this definition is that the communicative construct is dynamic in nature and occurs among and is built by two or more people and that the construct may be used by the individuals involved to obtain cognitive, social, affective, and instrumental benefits. Using this definition, Pettigrew concluded that the clinic environment could best be described as an information ground, that is, an "environment temporarily created by the behavior of people who have come together to perform a given task, but from which emerges a social atmosphere that fosters the spontaneous and serendipitous sharing of information" (PETTIGREW, 1999, p. 811). She explained that the foot clinic functioned as a rich information ground because information was shared in multiple directions (i.e., anyone at the clinic could give and obtain HSI) and because HSI was shared both purposefully and serendipitously. Pettigrew suggested that her information ground framework might be used to study informal information flow in other community settings, including hair salons, playgrounds where parents interact as their children play, meetings of special interest clubs, and other health clinics.

A prevalent approach that yielded rich fodder for studying social aspects of information behavior is social network theory. CHATMAN (1992), for example, used social network theory to study information flow among retired women and ultimately derived her theory of information poverty. WILLIAMSON used a social network approach, along with uses and gratification theory and ecological theory, to derive her model of incidental information acquisition. Derived from studying the everyday information behavior of 202 Australian seniors using a qualitative approach, her model describes how people obtain information, both accidentally and purposefully through their intimate personal networks (family, friends), wider personal networks (clubs, churches, voluntary organizations), and the mass media (newspapers, television, radio, magazines). Her model accounts for individuals' lifestyles, values, socioeconomic circumstances, physical environment, and personal characteristics. Sonnenwald's theory of information horizons, which is discussed in the next section, is also largely drawn from general social

network theory and shows how one may use the positioning of social ties to map the use of different information sources (SONNENWALD).

The use of social network theory in information behavior research has revealed many insights that might inform future work. PETTIGREW (2000), in testing Granovetter's theory of the strength of weak ties among nurses and the elderly, found that in addition to functioning as weak ties (who provide access to otherwise unavailable information), the nurses also exhibited characteristics of strong ties (who serve a legitimizing role), which doubly increased the value of their role as information providers to the elderly (GRANOVETTER, 1973; 1982). She labeled this new social type as "strong-weak ties," meaning they exhibit aspects of dual tie strength. HAYTHORNTHWAITE & WELLMAN used social network theory to study information exchange and media use among members of a university research group. Their findings regarding tie strength and the nature of ties yield broad implications for studying interpersonal relationships in other settings that might be woven into a theory of information behavior. Social capital theory, which is related to social network theory, also suggests promising approaches for basing future information behavior frameworks. HERSBERGER ET AL. are using the social capital theory (regarding individuals) of LIN to study how the homeless build and use social capital within their personal social networks to facilitate access to everyday information. At the community level, PETTIGREW & DURRANCE are working with the theory of social capital of PUTNAM (1995; 2000) in developing a framework that might explain how digital information services promote information flow and community cohesiveness.

In focusing on social aspects of information behavior, scholars seek to understand the impact of interpersonal relationships and dynamics on information flow and on how information sharing is a part of human communication. Since the 1980s Chatman was the sole researcher focusing primarily on social factors. In recent years she has been joined by several others who have largely turned to social network theory for guidance. This interest in the social and affective aspects of information behavior continues to draw increased research attention and, as discussed in the next section, is being incorporated into multifaceted models of information behavior.

MULTIFACETED APPROACHES

Recognizing the complexity in human information behavior, a growing number of researchers have pointed out that multiple viewpoints are required to capture this behavior. A model based on one viewpoint, whether cognitive or social, is not powerful enough to describe, ana-

lyze, explain, or predict this multifaceted phenomenon. ALLEN, for example, observed that there were four models for studying information behavior: cognitive, social, social-cognitive, and organizational. Using the rationalistic model of problem solving, he showed that each model addressed a particular situation and a particular type of need in each of the steps of problem solving, but none could address all situations. Therefore, he concluded, there is a need for a new model that takes into consideration all four models at the same time, one that is guided by a person-in-situation approach.

Allen's call for a multifaceted approach was not created in a vacuum. Indeed, researchers have been developing such models through a variety of means. Some have modified existing models by adding new facets to them, others have reexamined what was known about information behavior to create holistic models, and yet others have developed conceptual frameworks that were informed by multiple theories from a variety of disciplines.

The need to modify an existing model usually arises when researchers realize certain limitations in a model and, at the same time, they see additional elements that might address these limitations. At times, researchers empirically test the new model to find out if the modifications are valid and how to improve the model further. ROSENBAUM noticed that the explanatory power of the value-added approach developed by TAYLOR (1984; 1985; 1986) was limited because it was not grounded in theory of social action. Focusing on information behavior in organizations, he integrated this approach with the structuration theory of GIDDENS to create the "structurally-informed value-added" approach. While he did not test the new model, Rosenbaum demonstrated how it could address some basic issues in information science.

Still within the organizational setting, JOHNSON ET AL. developed a causal model to explain information-seeking behavior. The model suggested that a set of antecedent factors—which included sets of variables such as demographics, experience, and beliefs—provided the motivating force for a person to take information-seeking actions. These actions, in turn, were shaped by the information carrier factors, which determined the intention to seek information from a particular source (carrier). These factors included variables such as credibility and intention of the source. Through a series of tests in various organizations, this comprehensive model of information seeking (CMIS) has been developed gradually to include variables in each set of factors. It is an expansion of Johnson's model of media exposure and appraisal, and the variables in each set were also drawn from a variety of theories and models such as uses and gratification and the health belief model. Testing the model through a questionnaire that was distributed to

engineers and others who provided technical services, Johnson and his colleagues concluded that the model presented a general framework for information seeking but that it required the incorporation of additional contextual factors.

Another causal model was developed by BYSTRÖM & JÄRVELIN. They set out to show that the complexity of a task a person performed on the job affected information seeking and use. They derived this notion from organizational psychology and added another facet to their approach from the area of expert systems by defining three types of information: problem information, domain information, and problem-solving information. To test the new variable, they asked civil servants in a city government to fill in questionnaires and diaries. Results showed that task complexity indeed affected certain variables in information behavior. More specifically, an increase in task complexity brought an increase in the complexity of the information need, an increased need for domain and problem-solving information, an increase in the use of general-purpose sources (as opposed to fact-oriented ones), a decrease in the success of information seeking, a decrease in the use of internal channels, and an increase in the number of sources. Byström and Järvelin concluded that all holistic models of information behavior should include this variable.

Sonnenwald (SONNENWALD; SONNENWALD & PIERCE; SONNENWALD ET AL.) incorporated theories and frameworks from other disciplines as well. In developing her theory of information horizons, she drew upon the work of several information behavior theorists—most notably, Belkin, Dervin, Ingwersen, Kuhlthau, and Wilson—and upon social network theory and other frameworks from communications, sociology, and psychology. Her model, which is based on five propositions, was derived from empirical work on different groups, including high-tech workers, students, and military personnel. It focuses on the contexts and situations that create evolving information horizons that map the location of different information sources (both personal and media-oriented) within it. For Sonnenwald, information behavior is a collaborative process among individuals and information resources, and she proposed this information resource sociogram be used to explain how individuals subsequently engage in exploration, seeking, filtering, use, and dissemination of information.

An inductive approach to building a conceptual framework is to review the work that has been carried out in the field in order to identify patterns and to extract general constructs. Many user studies have been done in the past decades, and their analysis can point to general structures and factors that are relevant to information behavior. Reexamining studies about information-seeking behavior of engineers, health care professionals, and lawyers, LECKIE ET AL. created a new

holistic model. They based the model on the assumptions that studies of the information seeking of professionals should: understand the broader working context, examine in depth the details of the individual's work, include all the roles a professional had, and incorporate some flexibility to allow for the complexity and unpredictability in the process of information seeking. The model itself included six components: (1) work roles had (2) associated tasks, which in turn determined the (3) characteristics of an information need. Three additional components affected information-seeking behavior: (4) awareness of information, (5) sources of information, and (6) outcomes. These components were the main classes in the model, and each one contained variables that had been discovered in user studies.

The important role that the task and the context play in the processes associated with information behavior and the complexity and unpredictability of these processes were central to some conceptual constructs that were developed to guide and to inform the study of information behavior. Unlike the models described previously in this chapter, these constructs proposed a method for study rather than variables or other predictors that affect information behavior. They were developed to guide and to inform studies about human information behavior.

Cognitive work analysis (VICENTE) is a work-centered conceptual framework developed by RASMUSSEN ET AL. It was constructed as a general approach to help information system designers analyze and understand the complex interaction between (1) the activities, organizational relationships, and constraints of work domains and (2) users' cognitive and social activities and their subjective preferences during task performance. The framework's theoretical roots are in adaptive control systems and Gibson's ecological psychology and it is the result of the generalization of experiences from field studies that led to the design of support systems for a variety of modern work domains, such as process plants, manufacturing, hospitals, and libraries. Like cognitive systems engineering, it is based on the assumption that system design for work in dynamic environments should be based on the analysis of the factors that shape behavior rather than on the description of the procedures followed (PEJTERSEN ET AL.).

This approach assumes that information interaction is determined by a number of dimensions:

- the environment within which the workplace is operating;
- the work domain;
- the organization in terms of division of work and social organization;

- the task in terms of work domain;
- the decision making that is required for the task;
- the mental strategies that can be used for the task; and
- user characteristics, resources, and values.

Cognitive work analysis examines each dimension according to four abstraction levels: goals and constraints, priorities, work process, and physical resources. It thus provides a framework to guide in-depth analysis of information behavior and its context. Suppose, for example, that researchers study the information behavior of housewives. The cognitive work analysis framework suggests the research questions that they should ask. With relation to the strategies housewives employ, for instance, some questions would be: How do housewives make decisions? What are they looking for? How do they look for information? Why do they do it in this way? Where do they look for information? Why in these places? Do they have any preference about where to look for information? Why these preferences? Do they have any preferences about how to look for information? Why these preferences? Other dimensions will generate other questions about the decisions housewives make and the work they do. Thus, instead of determining a priori what variables affect housewives' information behavior, data collected to answer these questions present these variables and their manifestations for the population studied. Depending on the methods used, the findings of the analysis may be applicable to the behavior of a particular group of housewives or to all housewives.

This framework can be also used as a basis for the evaluation of information systems and services. The framework for system evaluation, which is based on the same dimensions, answers questions such as: Does the system support cooperative work and coordination? Does the system support the task repertoire of a work situation? Does the system support the relevant decision task? Are all relevant strategies supported? Does presentation match sensory characteristics? Therefore, the framework is both descriptive and prescriptive in nature because its purpose is not only to understand the current work but also to go beyond the observed work practice. This process of evaluation results in design recommendations. For example, if it is found that browsing is a desirable strategy for finding information that is not supported by a certain system, one can recommend that future systems and services be designed to support this strategy.

The cognitive work analysis approach has already been applied to various studies in information behavior. For example, PEJTERSEN & AUSTIN (1983; 1984) studied user interactions with reference librarians during fiction retrieval and MOREHEAD ET AL. considered problem formulation and application of computer-aided seeking in the same

environment. FIDEL ET AL. (1999) used this approach to study information-seeking behavior of high school students when they searched the Web to complete homework assignments. In addition, PEJTERSEN ET AL. investigated information needs during the design process in concurrent engineering, and FIDEL ET AL. (2001) examined collaborative information retrieval of a design team in the software industry. DUNLOP explained and demonstrated the application of this framework to the evaluation of information systems in his reflections on interactive evaluation in information retrieval.

Unlike the cognitive work analysis, most conceptual frameworks and models of information behavior do not lead directly to design recommendations and specifications. Even though some researchers noted that their constructs could be used for system design, none among those reviewed here showed how it could be done. Most researchers who study information behavior are not personally interested in the design of systems and services, and they report their studies to the benefit of other researchers of information behavior. This separation between the "human" side and the "system" side of information behavior is not useful if we believe that information systems and services should be designed to support information behavior and that the design of such systems be based on our understanding of this behavior. Therefore, one of the special strengths of the cognitive work analysis framework is in providing a direct link from the study of information behavior to system design.

System designers, on the other hand, have been developing interest in human information behavior, and both practitioners and researchers in this area have looked for methods to study information behavior. Most prominent is the area of human-computer interaction (HCI). BEYER & HOLTZBLATT, for example, summarized their system-building experience in a guide for students and design practitioners. They showed how to understand the information needs of customers and how to design systems that fit such needs. Other researchers employed various theories and approaches to understanding work and designing systems. A sample of these appeared in a special issue of the *International Journal of Human-Computer Studies* (FIELDS & WRIGHT), which focused on how to bridge the technology side and the human and social side. It contained articles that reported on studies and design projects that were guided by a range of theories—including ethnography, cognitive psychology, and cultural-historical activity theory—and used a variety of methods.

Because the context is an important factor in multifaceted approaches, it is customary to view "work" and "everyday life" as two distinct types of context, even though the distinction is not always clear (SAVOLAINEN, 1998). As can be seen from this review, most such

approaches addressed information behavior on the job. SAVOLAINEN (1995), however, focused on everyday life. Informed by the Sense-Making approach (DERVIN, 1994), he used the Habitus theory (BOURDIEU) to define "way of life" as the order of things that was created when people used their preferences to make choices in everyday life, and "mastery of life" as making sure that people actually adhered to their own preferences when they took on everyday activities. He explained that information-seeking habits were usually developed as part of the mastery of life and that social, cultural, economic, and psychological factors all together affected both way and mastery of life. To test and to improve his model, Savolainen conducted theme interviews with working-class and middle-class people to compare their information-seeking behaviors. Results were complex, requiring the consideration of the type of information source—whether paper or electronic—and the nature of the information need—whether a practical need to resolve a specific problem or an orienting need that did not result from any specific problem. He concluded that the mastery of life definition had to be developed further to include additional specific concepts for information seeking in everyday life.

One framework that clearly addresses all types of context is the Sense-Making approach. DERVIN (1999b) explained that Sense-Making is a metatheory that can inform and guide methods of studying information seeking. It is based on concepts relating to time, space, movement, and gap and "pictures the person as moving through time-space, bridging gaps and moving on" (DERVIN, 1999a, p. 45). Sense-Making has been developed constantly since Dervin and her colleagues initiated this approach in 1972. Throughout its journey, it has been informed by many theories and philosophical approaches, and in 1999 Dervin described it as a post-constructivist or postmodern modernist approach (DERVIN, 1999b, p. 730). While originally developed to study information need, seeking, and use communicatively, researchers in various areas, such as media studies, cultural studies, education and pedagogy, health communication, and telecommunication theory, have employed the approach.

Throughout its development and use, several themes became prominent. Among them (DERVIN, 1999b): humans are anchored in material conditions and at the same time have mind and spirit and can make abstractions, dream, feel, plan, have ambitions and fantasies, and tell stories; humans are involved in a constant journey in time and space of sense-making and of sense-unmaking; humans and their worlds are constantly evolving, and their description, therefore, requires verbing; human movement is affected by forces, and those should be always considered; ordinary human beings are theory makers; humans can articulate emotions, spiritual experiences, and embodied unconscious;

patterns and connectivities among human beings take many forms, including the causal, spontaneous, and collaborative; no *a priori* assumption about human patterning should be made; and there is a need for a researcher to be self-conscious and self-reflexive.

Given these themes, DERVIN (1999b) showed how Sense-Making challenged the assumptions that have usually been guiding research in human information behavior. Some of these challenges are: Sense-Making requires that the concept of information will not be considered a static absolute ontological category but as a structural term instead; it requires that information creating, seeking, and use will not be limited to the cognitive realm because they might involve a variety of experiences such as emotions, feelings, wishes, and dreams; finding information does not always result in a positive outcome, but in some situations it might be better to miss information; Sense-Making is looking at differences rather than commonalities, at the situational and specific rather than at the prototypical; information seeking and use do not always take place in an ordered world—they may require the creation of new orders; studies of information seeking and use should not look at these activities as habitual patterns but also as innovations; studies of information seeking and use should not be limited to the present but should include the past and the future; studies should not attempt to be limited to finding one central pattern or a group of patterns, but should find all useful patterns and explicitly look for exceptions and disruptions; and the researcher should recognize that she herself is an information seeker.

DERVIN (1999b) made clear that Sense-Making was developed to redesign communications procedures and systems. While this metatheory does not directly guide system design, DERVIN (1999a) presented a number of examples in which the approach has been used to design systems in settings such as the reference interview, relevance assessment, development and organization of a library's video collection, information presentation at a blood donation center, and in constructing a research community.

Both approaches, cognitive work analysis and Sense-Making, have guided and informed many studies in information behavior. To date, scores of researchers in various fields have selected Dervin's Sense-Making approach to guide their work. To name just a few, GLUCK examined a possible collaboration with semiotics to understand the active use of information and proposed a set of experiments that would help the two approaches to develop further. SOLOMON (1997b; 1997c; 1997d) investigated its applications to information behavior when he studied the annual work planning of a unit of a public agency over three annual iterations. Finally, SAVOLAINEN (1995) investigated information behavior in everyday life, as discussed earlier. On the practi-

cal side, MORRIS demonstrated how this approach could provide the basis for rethinking and potentially redesigning the library's mission, the provision and measurement of services, and the design of systems. Unlike the models described earlier, cognitive work analysis and Sense-Making can be applied to almost all situations of information behavior. In addition, as general frameworks, they facilitate comparisons of the information behavior of different groups of people or of the same group of people at different times and situations.

While both approaches have been evolving since the early 1970s, interest in multifaceted approaches began to spread only in the early 1990s and is growing rapidly. In addition, research in information behavior is no longer limited to library and information science but has extended to other areas such as computer science, communications, and management. The construction of holistic, comprehensive, and multifaceted models and frameworks has just begun, and most such models and frameworks are still being tested and developed.

CONCLUSION

Our review suggests that another quantum leap has occurred within information behavior. A distinct, unifying theoretical body is emerging that, beyond its strong, user-centered core, emphasizes the contextual interplay of cognitive, social, cultural, organizational, affective, and linguistic factors and asserts that information behavior phenomena are part of the human communicative process. This theoretical basis is largely derived from the collective results of extensive empirical investigation conducted over several decades and reflects the importation of frameworks from cognate fields, which is consistent with the view of BATES (1999) that information science itself is an orthogonal field that examines information phenomena across different settings using interdisciplinary perspectives. Theorists of information behavior are building upon one another's work by incorporating connecting features into new models and by enhancing existing models. The communication and collaboration that underlie this work have been greatly facilitated by the establishment of a biannual European conference series and a new special interest group within the American Society for Information Science as well as the recent publication of information behavior theme issues in several key journals.

The plethora of models found in the literature can be considered along three distinct categories that account for varying aspects of information behavior. While several general approaches to conceptualizing information behavior (e.g., Sense-Making, cognitive work analysis) that were developed in the 1980s have been refined and reflect a mature understanding of the phenomenon in terms of cognitive, social, and

other factors, the need for in-depth study of these individual factors remains. Only through focused study can rich insights be obtained regarding such novel concepts as third-party or proxy searching (e.g., ERDELEZ & RIOUX; GROSS, 1999; 2001), lay information giving (e.g., PETTIGREW, 2000), and the non-use of information or information blunting (e.g., BAKER, 1996; 1997), which are only beginning to be addressed. Despite giant strides in building a theoretical basis of information behavior that addresses such key concepts as information need and seeking, theorists must continue to enhance existing frameworks and derive new ones that account for emerging concepts. The uncovering of these related aspects is an additional sign of the field's maturation. Researchers are moving beyond established or recognized concepts to explore new ones that lie deep beneath and may undergird information behavior.

For the field of information behavior, the challenge remains to provide concrete guidance for system design. As noted, few frameworks offer suggestions for improving the design of information systems. The foci and attributes identified in the models reviewed suggest that information systems need to complement users' natural inclinations when communicating information needs and when seeking and using information in addition to considering the multiple roles of context and social, cultural, organizational, and affective factors. However, specific directions on how this might be accomplished remain scant. To create working systems that are truly user centered and that reflect the foundations of information behavior theory, greater dialogue and collaboration are sorely needed between theorists of information behavior and designers of information systems.

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3

Distributed Information Management

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INTRODUCTION

A review of this sort commonly begins with the observation that current developments in computer technology are radically changing the nature of library science and information management. Widespread digitization of information and the ubiquity of networking have created fundamentally new possibilities for collecting, distributing, and preserving information. Just as important, however, as the changing technological and organizational systems themselves are the repercussions these powerful world-scale information networks will have on the social and cultural structures they have been developed to serve. Similarly, the formation and development of these new technologies will, to no small extent, depend on the cultural forces that brought them into existence in the first place, as the shape of information technology and the institutions it serves are in many ways interdependent. To capture the complexity of the interwoven technological and societal forces that guide the growth of information management, then, we need to cast a wide net over the fields of information, computer, and library science to gather topics and themes in all those areas that are shaping and being shaped by the development of distributed information systems.

A picture of such a dynamic field, encompassing so many different areas of social and technological significance, must of necessity be broadly painted. This chapter delineates the scope and effects of distributed information management, touching on current developments, ex-

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