Information Behavior

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Abstract
"Information behavior" is the currently preferred term used to describe the many ways in which human beings interact with information, in particular, the ways in which people seek and utilize information. The broad history of research on information-seeking behavior over the last 50–60 years is reviewed, major landmarks are identified, and current directions in research are discussed.

INTRODUCTION

"Information behavior" is the currently preferred term used to describe the many ways in which human beings interact with information, in particular, the ways in which people seek and utilize information. Information behavior is also the term of art used in library and information science to refer to a subdiscipline that engages in a wide range of types of research conducted in order to understand the human relationship to information.

Interest in this area developed out of several streams. Librarians wanted to understand library users better, government agencies wanted to understand how scientists and engineers used technical information in order to promote more rapid uptake of new research results, and social scientists generally were interested in the social uses of information in a variety of senses. In more recent years, social studies of information technology and social informatics have contributed to this area as well. Within library and information science, these various streams of research are drawn on for what they can contribute to a richer understanding of information behavior.

INFORMATION

What, then, is information? Here, rather than review the many senses in which this term has been interpreted in the field (see ELIS entry "Information"), we will rely on a sense of the term that is an extended understanding of the concept as used in general conversation. We all recognize that people search for information on, say, the history of a small town, the population of Turkey, or how to do foreign exchange trading online. All these examples make a reasonable match with the generally understood sense of information as being factual, statistical, and/or procedural.

"Information," however, is used in a broader sense as well in the world of information behavior research. The term is generally assumed to cover all instances where people interact with their environment in any such way that leaves some impression on them—that is, adds or changes their knowledge store. These impressions can include the emotional changes that result from reading a novel or learning that one's friend is ill. These changes can also reflect complex interactions where information combines with preexisting knowledge to make new understandings or enables the individual to deduce or induce new thoughts and ideas. As the Hans Christian Andersen tale suggested, the ugly ducking did not realize that he was a swan until he came in contact with swans, saw his reflection in water, and figured out that he was himself a swan, too.[1]

These information interactions can also leave a negative impact—one may ignore, deny, or reject information.[2] (See also an excellent early analysis of relations to information by Atkin.[3]) One may also simply discover that nothing has changed—the university admissions letter still has not come in the mail. This negative news is, of course, informative in its own way, just as a person who has ignored information has often, in some way or other, nonetheless absorbed it. In fact, probably the largest amount of all information taken in by human beings is that received passively—simply through being aware—that is absorbed in the context of daily living.[4]

Is this not a very broad understanding of information behavior? Indeed, does it not cover all interactions people have with their environment? Bates has argued:

> In comparison to other social and behavioral science fields, we are always looking for the red thread of information in the social texture of people's lives. When we study people we do so with the purpose of understanding information creation, seeking, and use. We do not just study people in general. . . . In communications research, a cousin to our field, the emphasis is on the communication process and its effects on people; in information science we study that process *in service of information transfer*.[5]

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Bates goes on to provide a specific example:

> . . . [T]here are social scientists today who are observing people doing collaborative work through new types of networked systems in the field of computer-supported cooperative work (CSCW). The sociologist or social psychologist identifies and describes the network of relationships and the social hierarchy that develops under these circumstances. . . .
>
> The information scientist, on the other hand, follows the information . . . . That's the red thread in the social tapestry. When we look at that social hierarchy, we are not interested in the hierarchy per se, but, rather, we ask how it impedes or promotes the transfer of information. We ask what kinds of information people prefer to communicate through this or that new channel of information technology. We always follow the information.[5]

Thus, the study of information behavior can cast a very wide net, looking into both individual interactions and large-scale complex group and societal interactions with information. Indeed, as we shall see, the variety of contexts in which information behavior has been studied demonstrates this breadth. But information behavior research is not communication, psychology, education, sociology, or social impacts of technology research, though all those disciplines may find the work interesting to discover. Rather, information behavior research actually studies—and largely limits itself to—information-related behavior.

HISTORY OF INFORMATION BEHAVIOR RESEARCH

From the earliest days, librarianship in the United States had a commitment to care about and serve the users of libraries. In the founding year of American professional librarianship, 1876, Samuel Green wrote to encourage librarians to "mingle freely" with the library's users "and help them in every way."[6] In the mid-twentieth century, the great Indian librarian, S.R. Ranganathan, promulgated his Five Laws of Librarianship, which were very much oriented to the library user:

1. Books are for use.
2. Every reader, his book.
3. Every book its reader.
4. Save the time of the reader.
5. The library is a growing organism.[7]

However, for many decades that commitment remained largely on the plane of values and had little other than anecdotal data upon which to develop library services. In the 1930s, the Graduate Library School at the University of Chicago[8] introduced the first doctoral degree in library science in the United States. Sophisticated social science researchers, such as Douglas Waples and Bernard Berelson, brought their skills to the field. Waples[9] did research on reader preferences, and Berelson, among other things, produced a compendium of results from dozens of studies on public library use.[10,11]

The experiences associated with the operation of "Big Science" during World War II—major projects such as the development of the atom bomb—led government leaders to see the advantages in improving the distribution and transfer of information on new discoveries to other scientists and engineers. Major conferences on scientific information, in 1948 and 1959, led to a substantial amount of money being invested during the 1950s and 1960s in research on how scientists gathered and used information in their research work. Major example publications were the proceedings of the two science information conferences.[12,13] The 21-report series "Project on Scientific Information Exchange in Psychology" from the American Psychological Association,[14] and the work of Garvey et al. on several disciplines.[15,16] Other influential early works include publications by Derek de Solla Price,[17,18] Diana Crane,[19] and A.J. Meadows.[20] (Note: In order to keep this entry's long bibliography from being even longer, referenced items are often only a sample of a person's work, and when a series of articles comes out from a project, generally only the last article in the series is referenced.)

Early on, studies on information behavior were called "use studies."[21] studies of "information seeking and gathering," or studies of "information needs and uses."[22] Gradually, the term "information-seeking research" was used to include all kinds of research on people's interaction with information.

More recently, however, some researchers came to feel that "information seeking" suggested only explicit efforts to locate information and did not include the many other ways people and information interacted. In the 1990s, the term "information behavior" came into wide use to replace "information seeking." The Old Guard objected that the phrase is a non sequitur—information does not "behave"—but, they lost out, and "information behavior" remains the most commonly used term today.

During the 1960s, in particular, generous funding was available in the United States for social science research, and a great deal of knowledge, based on large, well-designed studies, was developed regarding the social aspects of scientific communication and information use.[23–25] Important studies were also produced on information use and library use by the general public.[26–29] Focus in the larger society during the 1960s and 1970s on identity politics of race, gender, sexual orientation, and the economically underprivileged also led to research attention being directed to information seeking of the corresponding population groups.

In the late 1960s and early 1970s, this research began to be taught in library and information educational programs

in North America.[30] As scientists had been studied according to their disciplines—physics, biology, etc.—and many members of the general public had been studied by their social identities—the poor, the elderly, etc.—there was a tendency to study information-related behavior by looking at groups of these sorts. For example, an invited conference on "information service needs of the nation" was funded by the U.S. National Commission on Libraries and Information Science in 1973. Presentations were structured in a parallel format to address the needs of a number of groups, including people working in science, agriculture, business, labor, biomedicine, the arts, social services, as well as children, the geographically remote, the economically and socially deprived, the institutionalized, and the mentally and physically handicapped, among others.[31]

After the earlier attention to the natural sciences, during the 1970s research attention turned to information transfer in the social sciences. Grant funding in the United States receded, and pride of place went to Great Britain, where several researchers engaged in creative and revealing research on information seeking and use in the social sciences.[32–34]

Finally, in the 1980s and 1990s the underfunded humanities at last got their due,[35–38] particularly with the support of large institutions such as the J. Paul Getty Trust.[39] In the 1990s, the needs of interdisciplinary and area studies researchers were addressed.[40] See, especially, Carole Palmer, as Issue Editor, of an issue of *Library Trends* on interdisciplinary information seeking,[41] as well as her subsequent book.[42]

Over the decades, varying amounts of information behavior research has been done in various professional contexts as well, including the health sciences,[43] law,[44] and business.[45] Among the professions, it is almost certainly the health sciences where the largest body of information behavior research has been done—probably due to abundant funding—while the education profession, despite the importance of information seeking for teachers, seems, mysteriously, to have drawn very little attention.[46,47]

In the 2000s, Kari and Hartel made a persuasive case for studying the information behavior of people engaged in activities aimed at fulfillment and self-realization, and their own research provided examples of what could be learned along this line.[48] Caidi, Allard, and Quirke review another recently growing area of research: immigrant information seeking and use.[49]

The sweeping impact of use of the Internet and of mobile devices has increasingly dominated the working and living of all the groups reviewed earlier. Recent extensive studies include Antonijevic and Cahoy's on scholars' information practices,[50] Mizrachi and Bates[51] on the practices of undergraduate college students, and Beheshti and Large's book on current uses by children and teens.[52]

Throughout the years, a number of models have been proposed to characterize various aspects of information behavior. Paisley beautifully characterized the subjective world of the scientist as constituting a series of contexts—local work environment, research specialty, discipline, larger cultural and political world, etc.[24] In 1981, Tom Wilson described information seeking in general in a model[53] that was subsequently very widely used and also reviewed a wide range of information behavior models in 1999.[54] Belkin et al. propounded the concept of "anomalous state of knowledge," or ASK,[55] as characterizing many information needs. That is to say, they argued that the information need is often complex and requires an extensive description to cover all the factors really at play in people's requests. Kuhlthau's Information Search Process model, based on extensive research, demonstrated how intricately the conceptualization of a paper or project was bound up with confusions and problems in searching for information.[56] Bates' "berrypicking," that is, picking up a bit of knowledge here and a bit of knowledge there, was seen to be an appropriate description of much of human searching to meet information needs,[57] in contrast to the previous generally assumed simple query that could be answered by a single retrieval from just one database.

Though extensive research on information seeking inside and outside of library and information science had been going on since the 1950s, it was an article by Dervin and Nilan in 1986,[58] however, that seemed to provide the impetus for a great increase in interest in the subject in library and information science. The authors articulated the value of placing the user/searcher at the center of research, and paying close attention to the internal motivations and needs of the information seeker. From a minority interest of a relatively few people, information behavior research exploded in LIS after that article appeared, and doctoral students flocked to the subject area. For example, the number of articles dubbed "Use studies," the standard term used in Wilson Web's article database *Library Literature and Information Full Text*, doubled per year in the 5 years between 1985 and 1990—from 76 to 155—while in the subsequent 18 years, the annual number has gone up by less than 60% to 245 in 2008 (author's database search). (Of course, these results could be artifacts of the publisher's indexing practices, and a fuller exploration would be needed to verify this conclusion.)

In particular, Dervin's conception of "sensemaking," the effort of people to make sense of many aspects of their lives through information seeking and use, has been a dominating force in recent research on information behavior.[59]

Dervin dismissed prior studies on grounds that "the studies assumed that the information brick was being thrown into the empty bucket"—that is, into the user of information.[60] In one blow, this clever metaphor both characterized and caricatured much of the more classically empirical scientific approaches to research on information

behavior and gave qualitative research techniques and philosophies a boost. Dervin's "brick" image was unfair to the many researchers who did not take a simplistic view of information transfer, including many of the people mentioned in this article to this point.[61] However, her emphasis on the importance of sense-making in motivating information seeking legitimated the subsequent emphasis on qualitative techniques in the field and enlarged the perspective of the whole subdiscipline of information behavior.

Indeed, over the years, increasing dissatisfaction was expressed by some researchers toward the prior orientation either to the individual seeking information or to studying the tendencies and preferences of large social groups, such as physicists or older people. These researchers sought to expand information behavior research, drawing on several theoretical paradigms of interest in the social sciences, such as social constructivism, social constructionism, and ethnographic techniques.[62]

The surest sign of this broader interest came in the form of the "Information Seeking in Context (ISIC)" conference that came to be presented every other year, mostly in Europe, beginning in 1996.[63] Conference attendees have sought to study information behavior in a way that goes beyond traditional research designs. They argue that context must be understood in a much fuller sense; they argue for rich, detailed, qualitative study of specific situations and contexts in order to understand the very nuanced ways in which people might receive and shape information.

They draw upon many different information-related theories and models,[64] as well as on the many varieties of metatheoretical and philosophical perspectives that have become popular in the social sciences and humanities.[65] See, as examples of these newer approaches, Ellis' grounded theory approach,[66] Talja's discourse analysis of the culture of music in relation to libraries,[67] Xu's application of activity theory to interactive information retrieval,[68] Reddy and Jansen's ethnographic study of collaborative information behavior in healthcare,[69] Limberg's[70] and Ford's[71,72] use of educational theory, and Srinivasan and Pyati's critical reexamination of information environments for diasporic groups.[73]

At the same time, research drawing on other, more classically scientific and engineering methodologies did not disappear. See Fidel and Pejtersen's use of the Cognitive Work Analysis Framework,[74,75] Sandstrom and Sandstrom's analysis of the methods of scientific anthropology as applied in library and information science,[76] Nicholas et al.'s study of online information seeking through transaction log analysis,[77] and even Bates' use of biological and evolutionary concepts in her recent work on information[78] and browsing.[79]

Perhaps the greatest sign of maturity of the field of information behavior research came with the publication—at last!—of the first book comprehensively addressing information seeking, by Donald Case, in 2002, third edition in 2012.[80]

The popularity of the ISIC conferences demonstrates the recent efflorescence of qualitative information behavior research beyond the borders of the (sometimes self-absorbed) research culture of the United States. Scholars from the United Kingdom (Tom Wilson, David Ellis, Nigel Ford, Elizabeth Davenport), Ireland (Crystal Fulton), Scandinavia (Louise Limberg, Olof Sundin, Annelise Mark Pejtersen), and Finland (Pertti Vakkari, Reijo Savolainen, Sanna Talja, Jannica Heinström) have presented and published at ISIC and elsewhere. Australian (Kirsty Williamson, Theresa Anderson) and Canadian researchers (Heidi Julien, Karen Fisher, Gloria Leckie, Lynne McKechnie, Pam McKenzie, Roma Harris, Chun Wei Choo) have also been very active in recent years.

Recently, Savolainen may have marked the beginning of a new phase in information research when he urged that the qualitative research on information behavior be called instead the study of "information practice."[81] He argued that the concept of "information behavior" is primarily associated with the cognitive viewpoint, while "information practice is mainly inspired by the ideas of social constructivism."[81]

> The concepts of information behavior and information practice both seem to refer to the ways in which people "deal with information." The major difference is that within the discourse on information behavior, the 'dealing with information' is primarily seen to be triggered by needs and motives, while the discourse on information practice accentuates the continuity and habitualization of activities affected and shaped by social and cultural factors . . . .[82]

More recently, Huizing and Cavanagh have enlarged and systematized the theory and methodology of research on information practice.[83] Their lucid exposition of this methodology is a good fit for the nature of information behavior study. They break down the traditional (and tired) contrast between the subjective and objective, they give physical objects the important role they should have in any theory of people and information, and they identify the dynamic nature of information seeking, without dissolving the study of it into confusing and nongeneralizable sets of very short-term and local acts. Huizing and Cavanagh's approach provides what is perhaps the best guiding philosophy at this time for further information behavior research.

In the last several years, there has also been a very active Special Interest Group on Information Behavior, founded by Barbara Wildemuth and Karen Fisher, among others, in the American Society for Information Science and Technology, which has held a number of preconferences and conference sessions, and offered awards for research in the area.

To follow the development of the research in this area, one can read the several chapters on the subject, starting with Menzel's in 1966[22] and ending with Fisher and Julien's in 2009,[84] which appeared periodically in the *Annual Review of Information Science and Technology*. (That review publication has now been subsumed within the *Journal of the Association for Information Science and Technology*.)

INFORMATION SEARCHING VERSUS INFORMATION SEEKING

This discussion addressed research on how people interact with information, how and when they seek information, and what uses they make of it. But it should be understood that throughout this period of time a parallel body of research and practical application was continuing that addressed the specifics of *the act of searching itself*. That is, in working with paper and online resources, many problems were encountered and skills needed to succeed in the specific acts associated with locating information in a paper or online resource. Bates' articles on information-searching tactics and search techniques[85,86] promoted greater attention to the complexities of identifying sources and working one's way through resources to locate the desired information. A long line of research followed that addressed both search success and desirable design features in information systems to promote ease of use[87–91] (See also ELIS entry "Information searching and search models."). Even browsing, normally seen as the most unstructured method of information searching, came in for considerable attention.[79,92,93]

ROLE OF TECHNOLOGY IN INFORMATION BEHAVIOR RESEARCH

In order to simplify the narrative line, the aforementioned discussion made little mention of the role of technology in information seeking and research on information seeking. But, in fact, the extraordinary changes in information technology (IT) over the last 50–60 years have meant that a great deal of information behavior research has also been concerned with impacts of and reactions to the kinds of interactions people experience when using new technologies for finding and communicating information.

Focus on impacts of, and roles of, IT in information behavior has been intertwined to a greater and lesser extent with the information behavior research over these decades. Early studies took a fairly stable, largely paper-based environment for granted. Indeed, Garvey's research[23] made salient, perhaps for the first time for many readers of his work, the huge, complex scientific publication cycle, from early tentative verbal presentation at talks all the way through conference presentations, summary reports, journal publication, annual reviews, and, finally, incorporation of the scientific results into the established canon in textbooks.

But consciousness of the complexity of the production and publication of science was soon joined by efforts to improve, especially to speed up, the collection, storage, organization, and dissemination of that information.

Indeed, the entire discipline of information science has, in one sense, been the story of the successive absorption of a long series of IT innovations, followed, in each case, by research on the impacts of those innovations, and efforts to improve access to information through optimal design of those innovations. With the excitement generated by each new technology, the relatively stable underlying human behaviors and reactions were sometimes forgotten, and the new technology instead seen as the source of a totally new information-seeking landscape. One thing we now know, however, after a lot of research on those successive waves of new technology, is that underlying human propensities with regard to information emerge again and again as each new technology becomes familiar and its use second nature. Often, in the end, the new technologies offer speed and ease of use, while otherwise replicating previous social structures and interactions.

We know, for example, that people are willing to commit very little energy and effort to seeking information, in contrast, say, to seeking a fortune, a family, or a reputation. In fact, the truly explosive popularity of the World Wide Web as an information source may be due to the fact that the level of effort the searcher must engage in to find an answer to a question on the Web is at last so very little as to slip in under that minimal level of (least) effort that feels "natural" in information seeking. Most of the information that people eagerly seek online was once available in their local public or academic library, but the effort required to locate that information was seen as excessive in the vast majority of cases.

In the rest of this section, we will follow several IT innovations and consider their impact on information behavior research.

The first major technology in modern times to affect information seeking was the computer. Initially, its use for library information systems was limited—computers were used to capture machine-readable versions of library catalog records ("MARC" records), which, in turn, enabled the publication of computer-produced print-on-paper book catalogs. This was followed, in short succession, by so-called "COM cats," that is, computer output microfiche catalogs, which could update book catalogs between publications of paper editions.[94]

It will be forgotten today that in the age of card catalogs, while in one library, one could not access the catalog of any other branch of the academic or public library, or of any other library, for that matter. In academic libraries, a comprehensive copy of all the materials on campus was generally available only in the main library.

Disseminating multiple copies of the full set of library records through book catalogs and COM cats in branch libraries was a significant, time-saving innovation.

These catalog innovations during the late 1960s and 1970s were followed by a true revolution in catalog accessibility—the online catalog, which was developed in the early 1980s. These constituted the first widely available end user information search systems, and much was learned about how untrained people did and did not succeed in this form of online searching.[95,96]

For a variety of reasons, the card catalog structure could not be simply translated into online form. Questions of redesign of catalog access in the new context, and the development of new and faster system designs to improve access occupied many in LIS research over the next 10–15 years.[97–99] (See also ELIS entry "Online catalog subject searching.")

In the meantime, (at least) four other overlapping information-related revolutions were occupying the field as well. The first revolution occurred in the area of information retrieval, where various forms of automatic indexing and retrieval were experimented with over decades from the 1950s forward, gradually improving the speed and effectiveness of both retrieval and ranking algorithms.[100,101] In the 1990s, search engines, such as Alta Vista and Google, drew upon these retrieval techniques to design their Web systems.

Second, in the early 1970s, online database searching was made practicable through searching against large databases on "dumb" (typewriter-like) terminals receiving and sending data over telephone wires. "Online searching" as then understood, and as then implemented by database vendors, was a complex skill that required considerable training to do well. Teaching these skills became an important part of LIS education and drew a lot of research interest as well. That type of searching required a mix of gifts that not everyone has, and numerous studies of online searching behavior resulted.[88,102,103]

The third revolution was the development of the Internet and World Wide Web, which enabled access to information all over the world from anywhere in the world. We are still working through the many impacts and implications of this capability for all prior information technologies and sources of information.[104–106]

The fourth revolution occurred with the widespread interest in creating digital libraries of all manner of textual and image material—and sometimes online portals to access those resources. The Digital Libraries Initiative in the 1990s marked the moment when, at last, truly substantial amounts of research money entered the information science field. Ann Bishop and colleagues addressed at book length the sociotechnical factors of digital library use.[107] The new capability of storing and easily accessing previously unimaginably large bodies of information in digital libraries led to innovative experiments in the storage and use of primary resources materials. Example studies are those of children using primary archival materials,[108] uses of texts in the field of classics in a digital library,[109] and use of a medical portal.[110]

During the 1970s to the present, many studies of information behavior involved, to a greater or lesser extent, research on people's use of and success with, these innovations in information access. On the whole, more behavioral research was done in the areas of online catalogs and online database searching than in information retrieval. For a long time, IR researchers were not particularly receptive to, or interested in, the human side of the equation, though in the 1990s they came to realize that people needed attention, too, in the overall effort to improve retrieval. See, for example, the contrasting emphases in the two entries in this encyclopedia by Salton ("SMART System: 1961–1976") and Järvelin and Ingwersen ("User-oriented and cognitive models of information retrieval").

With the development of frequent interaction with microcomputers in the early 1980s, the already-thriving field of human–computer interaction research (HCI) exploded and became a still larger field. HCI paid little attention to LIS research, however, and LIS paid little attention to HCI research, probably to the detriment of both fields. However, there may have been good reasons for this mutual indifference. The specific circumstances of needing and seeking information are not well understood, for the most part, outside of LIS, and required the focused attention of LIS researchers. At the same time, HCI researchers were working to discover general principles applicable to all online and computer access, and therefore tended to ignore the distinctive features of various "application" fields, including information seeking. (See ELIS article "Human–computer interaction for information retrieval.") Perhaps the best blend of information science and HCI approaches to search user interfaces can be found in Hearst.[111]

In this encyclopedia, Diane Nahl's two articles on early and recent "User-centered design," as well as articles by Elaine Toms ("User-centered design of information systems") and Judith Weedman ("Design science in the information sciences") address, in much greater detail, the efforts and results in this area at the intersection of information technology and the study of information behavior.

RANGE OF TOPICS OF INFORMATION BEHAVIOR RESEARCH

What have we learned over the years from the study of information-seeking behavior? This is a hard question to answer briefly, to put it mildly, but a description of the sequence of research topics of interest over the years may give a hint of the growing understanding over time of the human relationship with information. What follows is a mere sampling.

In the 1940s and 1950s, information seeking and gathering tended to be viewed implicitly as the study of the use of various forms of literature—books, journals, handbooks, etc.—and of various types of institutions and their services. How many books were circulated, how many reference questions were asked, how many people of what economic strata used the public library, and so on (see Berelson[10]).

In the 1960s and beyond, studies of information seeking and use by the general public opened out the research to incorporate many sources of information, of which the library was only one.[27,112] The first surprise was to discover how much information—in both personal and professional contexts—people got from friends and colleagues. In a study looking at how scientists' learned of things serendipitously, Menzel found that fellow scientists were immensely important in that process.[113] In fact, in a large number of studies, the human preference to get information from other people was soundly demonstrated.

From early on, the dominance of the "principle of least effort" in human information seeking was demonstrated over and over.[25] It may not seem surprising that people try to minimize effort in finding information, but the research demonstrated that ease of access and ease of use mattered more to people than the quality of the information they found. People have a (sometimes unjustified) belief in their ability to filter the good and valid information from the faulty, hence their tendency to undersearch to find the highest quality information available.

Further, information seeking is often quite unself-conscious. People are trying to solve problems in their lives, not "seek information." Activities that involve information seeking are seldom differentiated from the other actions taken to solve problems. Good research design for the study of information seeking *must* recognize this reality; asking people what they have done lately in the way of information seeking is therefore not the way to get data with high internal validity, as a rule. Dervin has made this point repeatedly and insightfully. For a prime example of her research technique, see Dervin.[114]

Thus, as a rule, people—even including Ph.D. scholars—develop what search skills they have incidentally to their primary efforts at research or problem-solving and often fail to develop a conscious repertoire of search skills and techniques to help them over difficult stages. Particularly among college students, discomfort regarding library research has been found to be severe enough to merit the term "library anxiety," and a number of studies have been done on this topic (see ELIS entry "Library anxiety"). Along with the evidence of student difficulties with libraries, a large literature has developed on the goals and techniques of teaching "information literacy," that is, the capability of finding and effectively evaluating desired information (see ELIS entries "Information literacy" and "Information literacy instruction"). In sum, people often vastly underutilize available resources and are often quite inefficient in finding what they do find.

In the study of various academic disciplines, the close attention in the 1960s to the rich complexity of the culture of science enabled a subtler analysis of the information seeking in all the academic disciplines studied from the 1970s to the present time. See, for example, Patrick Wilson on the concept of "cognitive authority,"[115] Julie Hurd on implications of information use patterns for library design,[116] Paisley on "information and work,"[117] Robert Taylor on "information use environments,"[118] Cronin on invisible colleges (i.e., informal groups of researchers with shared interests),[119] the model by Leckie et al. of information seeking in the professions,[120] and Budd[121] and Bates[122] comparing the cultures of science and humanities. In the understudied area of archival resources, Barbara Orbach[123] and Wendy Duff and Catherine Johnson[124] have provided insightful descriptions of the use of historical archival materials.

During the 1980s and 1990s, several researchers deepened the understanding of various aspects of information behavior by exploring questions and areas previously not as well understood. Elfreda Chatman looked at the information environments of janitors, women in a retirement home, and prisoners.[125–127] Cheryl Metoyer-Duran applied the concept of gatekeeping to five minority groups in Southern California and developed sophisticated (and sometimes counterintuitive) understandings about information flow within minority communities, and between them and the larger society.[128] The challenge of studying unconventional groups and domains even extended to abused women[129] and abused children.[130]

Carol Kuhlthau is another researcher who has had very wide influence in the information behavior world. She developed a model of student information seeking, which she refined over several studies that are themselves models of the art of research. Her model runs counter to many assumptions in both education and library and information science about how people tackle researching a paper or project, and how that experience can be substantially improved over past approaches.[131] Specifically, she discovered that the combined process of researching and writing a paper is complex and difficult for most people—indeed, the library research is inextricably bound with the understanding and gradual formulation of the thesis of the paper. Consequently, the simple idea of "picking a topic," like picking an apple off a tree, then going to research it in the library, is not how the process reasonably can or should be expected to proceed. Yet generations of teachers and professors have left students floundering and frustrated as they moved, essentially without guidance, through this core process in paper-writing.

David Ellis' empirically based model of common actions associated with scholarly information seeking[132] has also been influential, spurring several follow-on studies to test for similar activities in the work of people in

other circumstances. And, of course, Brenda Dervin's concept of "sensemaking" as a motivation for information seeking constituted the underlying model for much information behavior research.[60]

In the 1990s and 2000s, along with the growth of the ISIC community, researchers expanded their look at information behavior by incorporating the whole environment—physical, social, and technological—in the study of people's interactions with information. Social context and social situation were recognized as essential to the understanding of information seeking.[133,134] Karen Fisher (nee Pettigrew) developed the concept of "information grounds"—the joint creation of social environments by people in which to share conversation and information.[135] Disciplinary examples of these rich analyses include science[42] and business.[136] As noted earlier, the study of "information practice," as a shaping paradigm for information behavior research, has emerged strongly in the twenty-first century.[83]

Several recent studies have demonstrated particularly creative approaches to the study of children's information seeking, traditionally an underpopulated area of research. Virginia Walter demonstrated that children's information needs were immense and were in no way limited to requests made of school librarians![137] Joanne Silverstein studied unconventional forms of information use,[138] and Ciaran Trace studied informal information creation and use by children.[139] Research on the "information behavior of a new generation" is discussed in the recent book edited by Beheshti and Large.[52]

During recent decades, a more sophisticated understanding has also developed of information genres and the ways they are shaped by practice. In a particularly elegant study, Kling and McKim showed how preexisting social information practices shaped the design of post-Web online information support in three scientific disciplines.[140] Peiling Wang studied at the micro level how scientists actually make use of and subsequently cite other literature in the course of their research.[141] Ann Bishop[142] and Lisa Covi[143] studied closely the interactions between people and the structure and genres of information.

CONCLUSIONS

Information behavior research has grown immensely from its scattered beginnings earlier in the twentieth century. We now have a much deeper and less simplistic understanding of how people interact with information. We understand information behavior better within social contexts and as integrated with cultural practices and values. The further complexity of information seeking through the use of various technologies and genres is coming to be better understood, though there is much more to be studied. In fact, even as I write, some six billion people are interacting with information worldwide, drawing on cognitive and evolutionarily shaped behaviors, on social shaping and environmental expectations, and interacting with every information technology from the book to the wireless handheld "smartphone." There is unimaginably much more to learn about information behavior.

The state of our current understandings on these topics is reviewed in over 30 articles in this encyclopedia. See, especially, the section titled "People using cultural resources" in the topical contents list of the encyclopedia.

REFERENCES

1. Andersen, H.C.; Lucas, E. The ugly duckling. In *Fairy Tales from Hans Christian Andersen*, 3rd Ed.; J.M. Dent & Co.: London, U.K., 1907; 379–387.
2. Case, D.O.; Andrews, J.E.; Johnson, J.D.; Allard, S.L. Avoiding versus seeking: the relationship of information seeking to avoidance, blunting, coping, dissonance, and related concepts. J. Med. Libr. Assoc. **2005**, *93* (3), 353–362.
3. Atkin, C. Instrumental utilities and information seeking. In *New Models for Mass Communication Research*; Clarke, P., Ed.; Sage: Beverly Hills, CA, 1973; Vol. 2, 205–239.
4. Bates, M.J. Toward an integrated model of information seeking and searching. New Rev. Inf. Behav. Res. **2002**, *3*, 1–15. Also available at https://pages.gseis.ucla.edu/faculty/bates/ (accessed June 2016).
5. Bates, M.J. The invisible substrate of information science. J. Am. Soc. Inf. Sci. **1999**, *50* (12), 1048.
6. Green, S.S. Personal relations between librarians and readers. Am. Libr. J. **1876**, *1*, 78.
7. Ranganathan, S.R. *The Five laws of Library Science*, 2nd Ed.; Blunt and Sons: London, U.K., 1957. See also http://dlist.sir.arizona.edu/1220/ (accessed December 2008).
8. Richardson, J.V., Jr. *The Spirit of Inquiry; the Graduate Library School at Chicago, 1921–1951*, ACRL Publications in Librarianship; American Library Association: Chicago, IL, 1982; Vol. 42.
9. Waples, D. *People and Print; Social Aspects of Reading in the Depression*; University of Chicago Press: Chicago, IL, 1938.
10. Berelson, B. *Library's Public*; Columbia University Press: New York, 1949.
11. Berelson, B. The public library, book reading, and political behavior. Libr. Q. **1945**, *15* (4), 281–299.
12. Royal Society of London. *Royal Society of London Scientific Information Conference, Report*; Royal Society: London, U.K., 1948.
13. Proceedings of the International Conference on Scientific Information Washington, DC, November 16–21, 1958.; National Academy of Sciences, National Research Council: Washington, DC, 1959; 2 volumes.
14. American Psychological Association. *Project on Scientific Information Exchange in Psychology*; American Psychological Association: Washington, DC, 1963–1968. 21 reports.

15. Garvey, W.D.; Griffith, B.C. Scientific communication as a social system. Science **1967**, *157*, 1011–1016.
16. Garvey, W.D. Communication in the physical and social sciences. Science **1970**, *11*, 1166–1173.
17. Price, D.j.d.S. *Little Science, Big Science*; Columbia University Press: New York, 1963.
18. Price, D.J.d.S. Networks of scientific papers. Science **1965**, *149*, 510–515.
19. Crane, D. *Invisible Colleges: Diffusion of Knowledge in Scientific Communities*; University of Chicago Press: Chicago, IL, 1972.
20. Meadows, A.J. *Communication in Science*; Butterworth: London, U.K., 1974.
21. Davis, R.A.; Bailey, C.A. *Bibliography of Use Studies*; Drexel Institute of Technology, Graduate School of Library Science: Philadelphia, PA, 1964.
22. Menzel, H. Information needs and uses in science and technology. Annu. Rev. Inf. Sci. Technol. **1966**, *1*, 41–69.
23. Garvey, W.D. *Communication: The Essence of Science: Facilitating Information Exchange Among Librarians, Scientists, Engineers, and Students*; Pergamon Press: New York, 1979.
24. Paisley, W.J. Information needs and uses. Ann. Rev. Inf. Sci. Technol. **1968**, *3*, 1–30.
25. Poole, H. *Theories of the Middle Range*; Ablex: Norwood, NJ, 1985.
26. Warner, E.S., et al. *Information Needs of Urban Residents*; Regional Planning Council/Westat Research, Inc.: Baltimore, MD/Rockville, MD, 1973; (ERIC ED 088 464).
27. Dervin, B. *Development of Strategies for Dealing With the Information Needs of Urban Residents: Phase I—Citizen Study. Final Report*; University of Washington, Department of Communication: Seattle, WA, 1976; (ERIC ED 125 640).
28. Bundy, M.L. Metropolitan public library use. Wilson Libr. Bull. **1967**, *41*, 950–961.
29. Bundy, M.L. Factors influencing public library use. Wilson Libr. Bull. **1967**, *42*, 371–382.
30. Bates, M.J. Information science at the University of California at Berkeley in the 1960s: a memoir of student days. Libr. Trends **2004**, *52* (4), 683–701.
31. Cuadra, C.A.; Bates, M.J., Eds. *Library and Information Service Needs of the Nation: Proceedings of a Conference on the Needs of Occupational, Ethnic, and other Groups in the United States*. Sponsored by the National Commission on Libraries and Information Science, University of Denver, 1973; U.S. Government Printing Office: Washington, DC, 1974.
32. Streatfield, D.R.; Wilson, T.D. Information innovations in social services departments: a third report on Project INISS. J. Doc. **1982**, *38*, 273–281.
33. Blake, B.; Morkham, T.; Skinner, A. Inside information: social welfare practitioners and their information needs. Aslib Proc. **1979**, *31*, 275–283.
34. Brittain, J.M. Information services and the structure of knowledge in the social sciences. Int. Soc. Sci. J. **1979**, *31* (4), 711–728.
35. Case, D.O. Conceptual organization and retrieval of text by historians: the role of memory and metaphor. J. Am. Soc. Inf. Sci. **1991**, *42* (9), 657–668.
36. Chu, C.M. Literary critics at work and their information needs: a research-phases model. Libr. Inf. Sci. Res. **1999**, *21* (2), 247–273.
37. Cobbledick, S. Information-seeking behavior of artists: exploratory interviews. Libr. Q. **1996**, *66*, 343–372.
38. Wiberley, S.E., Jr.; Jones, W.G. Patterns of information seeking in the humanities. Coll. Res. Libr. **1989**, *50*, 638–645.
39. Bates, M.J. Getty end-user online searching project in the humanities: report no. 6: overview and conclusions. Coll. Res. Libr. **1996**, *57*, 514–523.
40. Westbrook, L. Information needs and experiences of scholars in women's studies: problems and solutions. Coll. Res. Libr. **2003**, *64* (3), 192–209.
41. Palmer, C.L. Issue Editor. *Libr. Trends* **1996**, *45* (2), 129–366.
42. Palmer, C.L. *Work at the Boundaries of Science: Information and the Interdisciplinary Research Process*; Kluwer Academic Publishers: Boston, MA/Dordrecht, the Netherlands, 2001.
43. Davies, K. The information-seeking behaviour of doctors: a review of the evidence. Health Inf. Libr. J. **2007**, *24* (2), 78–94.
44. Sutton, S.A. Role of attorney mental models of law in case relevance determinations: an exploratory analysis. J. Am. Soc. Inf. Sci. **1994**, *45*, 186–200.
45. Auster, E.; Choo, C.W. Environmental scanning by CEOs in two Canadian industries. J. Am. Soc. Inf. Sci. **1993**, *44* (4), 194–203.
46. Summers, E.G.; Matheson, J.; Conry, R. The effect of personal, professional, and psychological attributes, and information seeking behavior on the use of information sources by educators. J. Am. Soc. Inf. Sci. **1983**, *34* (1), 75–85.
47. Williams, D.; Coles, L. Evidence-based practice in teaching: an information perspective. J. Doc. **2007**, *63* (6), 812–835.
48. Kari, J.; Hartel, J. Information and higher things in life: addressing the pleasurable and the profound in information science. J. Am. Soc. Inf. Sci. Technol. **2007**, *58* (8), 1131–1147.
49. Caidi, N.; Allard, D.; Quirke, L. Information practices of immigrants. Annu. Rev. Inf. Sci. Technol. **2010**, *44*, 493–531.
50. Antonijevic, S.; Cahoy, E.S. Personal library curation: an ethnographic study of scholars' information practices. Portal: Libr. Acad. **2014**, *14* (2), 287–306.
51. Mizrachi, D.; Bates, M.J. Undergraduates' personal academic information management and the consideration of time and task-urgency. J. Am. Soc. Inf. Sci. Technol. **2013**, *64* (8), 1590–1607.
52. Beheshti, J.; Large, A., Eds. *The Information Behavior of a New Generation: Children and Teens on the 21st Century*; Scarecrow Press: Lanham, MD, 2013.
53. Wilson, T.D. On user studies and information needs. J. Doc. **1981**, *37*, 3–15.
54. Wilson, T.D. Models in information behaviour research. J. Doc. **1999**, *55* (3), 249–270.
55. Belkin, N.J.; Oddy, R.N.; Brooks, H.M. ASK for information retrieval: part I. background and theory. J. Doc. **1982**, *38* (2), 61–71.

56. Kuhlthau, C.C. Inside the search process: information seeking from the user's perspective. J. Am. Soc. Inf. Sci. **1991**, *42*, 361–371.
57. Bates, M.J. The design of browsing and berrypicking techniques for the online search interface. Online Rev. **1989**, *13*, 407–424.
58. Dervin, B.; Nilan, M. Information needs and uses. Annu. Rev. Inf. Sci. Technol. **1986**, *21*, 3–33.
59. http://communication.sbs.ohio-state.edu/sense-making/AAauthors/authorlistdervin.html (accessed June 2008).
60. Dervin, B. Information as a user construct: the relevance of perceived information needs to synthesis and interpretation. In *Knowledge Structure and Use: Implications for Synthesis and Interpretation*; Ward, S.A., Reed, L.J., Eds.; Temple University Press: Philadelphia, PA, 1983; 161.
61. Talja, S.; Hartel, J. Revisiting the user-centered turn in information science research: an intellectual history perspective. Inf. Res. **2007**, *12* (4), paper colis04. (available at http://InformationR.net/ir/12-4/colis/colis04.html).
62. Talja, S.; Tuominen, K.; Savolainen, R. 'Isms' in information science: constructivism, collectivism and constructionism. J. Doc. **2005**, *61* (1), 79–101.
63. http://www.kf.vu.lt/~isic2008/?page_id=4 (accessed June 2008).
64. Fisher, K.E.; Erdelez, S.; McKechnie, L.(E.F.), Eds. *Theories of Information Behavior*; American Society for Information Science and Technology by Information Today: Medford, NJ, c2005.
65. Bates, M.J. An introduction to metatheories, theories, and models. In *Theories of Information Behavior*; Fisher, K.E., Erdelez, S., McKechnie, L.(E.F.), Eds.; American Society for Information Science and Technology: Medford, NJ, c2005; 1–24.
66. Ellis, D. Modeling the information-seeking patterns of academic researchers: a grounded theory approach. Libr. Q. **1993**, *63* (4), 469–486.
67. Talja, S. *Music, Culture, and the Library: An Analysis of Discourses*; Scarecrow Press: Lanham, MD, c2001.
68. Xu, Y.; Liu, C. The dynamics of interactive information retrieval, part II: an empirical study from the activity theory perspective. J. Am. Soc. Inf. Sci. Technol. **2007**, *58* (7), 987–998.
69. Reddy, M.C.; Jansen, B.J. A model for understanding collaborative information behavior in context: a study of two healthcare teams. Inf. Process. Manage. **2008**, *44* (1), 256–273.
70. Limberg, L. Experiencing information seeking and learning: a study of the interaction between two phenomena. Inf. Res. **1999**, *5*(1) (available at: http://informationr.net/ir/5-1/paper68.html).
71. Ford, N. Psychological determinants of information needs: a small-scale study of higher education students. J. Librariansh. **1986**, *18* (1), 47–62.
72. Ford, N. Towards a model of learning for educational informatics. J. Doc. **2004**, *60* (2), 183–225.
73. Srinivasan, R.; Pyati, A. Diasporic information environments: reframing immigrant-focused information research. J. Am. Soc. Inf. Sci. Technol. **2007**, *58* (12), 1734–1744.
74. Fidel, R.; Pejtersen, A.M. From information behaviour research to the design of information systems: the Cognitive Work Analysis framework. Inf. Res. **2004**, *10* (1), paper 210. (available at http://InformationR.net/ir/10-1/paper210.html).
75. Fidel, R. *Human Information Interaction: An Ecological Approach to Information Behavior*; MIT Press: Cambridge, MA, 2012.
76. Sandstrom, A.R.; Sandstrom, P.E. The use and misuse of anthropological methods in library and information science research. Libr. Q. **1995**, *65* (2), 161–199.
77. Nicholas, D.; Huntington, P.; Jamali, H.R.; Watkinson, A. The information seeking behaviour of the users of digital scholarly journals. Inf. Process. Manage. **2006**, *42* (5), 1345–1365.
78. Bates, M.J. Information and knowledge: an evolutionary framework for information science. Inf. Res. **2005**, *10*(4), paper 239. (available at http://InformationR.net/ir/10-4/paper239.html).
79. Bates, M.J. What is browsing—really? A model drawing from behavioural science research. Inf. Res. **2007**, *12* (4), paper 330. (available at http://InformationR.net/ir/12-4/paper330.html).
80. Case, D.O. *Looking for Information: A Survey of Research on Information Seeking, Needs, and Behavior*, 3rd Ed.; Emerald Group Publishing: Bingley, U.K., 2012.
81. Savolainen, R. Information behavior and information practice: reviewing the "umbrella concepts" of information-seeking studies. Libr. Q. **2007**, *77* (2), 109–132.
82. Savolainen, R. Information behavior and information practice: reviewing the "umbrella concepts" of information-seeking studies. Libr. Q. **2007**, *77* (2), 126.
83. Huizing, A.; Cavanagh, M. Planting contemporary practice theory in the garden of information science. Inf. Res. **2011**, *16*(4), paper 497. (available at http://InformationR.net/ir/16-4/paper497.html).
84. Fisher, K.E.; Julien, H. Information behavior. Annu. Rev. Inf. Sci. Technol. **2009**, *43*, 1–73.
85. Bates, M.J. Information search tactics. J. Am. Soc. Inf. Sci. **1979**, *30*, 205–214.
86. Bates, M.J. Search techniques. Annu. Rev. Inf. Sci. Technol. **1981**, *16*, 139–169.
87. Cochrane, P.A.; Markey, K. Catalog use studies-before and after the introduction of online interactive catalogs: impact on design for subject access. Libr. Inf. Sci. Res. **1983**, *5* (4), 337–363.
88. Fidel, R. Online searching styles: a case-study-based model of searching behavior. J. Am. Soc. Inf. Sci. **1984**, *35* (4), 211–221.
89. Hsieh-Yee, I. Effects of search experience and subject knowledge on online search behavior: measuring the search tactics of novice and experienced searchers. J. Am. Soc. Inf. Sci. **1993**, *44*, 161–174.
90. Marchionini, G. *Information Seeking in Electronic Environments*; Cambridge University Press: Cambridge, U.K., 1995.
91. Spink, A.; Wolfram, D.; Jansen, B.J.; Saracevic, T. Searching the web: the public and their queries. J. Am. Soc. Inf. Sci. Technol. **2001**, *52* (3), 226–234.
92. O'Connor, B. Browsing: a framework for seeking functional information. Knowl. Creativity Diffus. Util. **1993**, *15* (2), 211–232.
93. Rice, R.E.; McCreadie, M.; Chang, S.L. *Accessing and Browsing Information and Communication*; MIT Press: Cambridge, MA, 2001.

94. Hodges, T.; Bloch, U. Fiche or film for COM catalogs—two use tests. Libr. Q. **1982**, *52* (2), 131–144.
95. Matthews, J.R.; Lawrence, G.S.; Ferguson, D.K., Eds. *Using Online Catalogs: A Nationwide Survey*; Neal-Schuman: New York, 1983.
96. Lynch, C.A. The next generation of public access information retrieval systems for research libraries: lessons from ten years of the MELVYL system. Inf. Technol. Libr. **1992**, *11*, 405–415.
97. Bates, M.J. Subject access in online catalogs: a design model. J. Am. Soc. Inf. Sci. **1986**, *37*, 357–376.
98. Hildreth, C.R. *Intelligent Interfaces and Retrieval Methods for Subject Searching in Bibliographic Retrieval Systems*, Advances in Library Information Technology #2; Library of Congress Cataloging Distribution Service: Washington, DC, 1989.
99. Borgman, C.L. Why are online catalogs still hard to use? J. Am. Soc. Inf. Sci. **1996**, *47*, 493–503.
100. Salton, G.; McGill, J.M. *Introduction to Modern Information Retrieval*; McGraw-Hill: New York, 1983.
101. Voorhees, E.M.; Harman, D.K., Eds. TREC – *Experiment and Evaluation in Information Retrieval*; The MIT Press: Cambridge, MA, 2005.
102. Saracevic, T.; Kantor, P. A study of information seeking and retrieving. III. Searchers, searches, and overlap. J. Am. Soc. Inf. Sci. **1988**, *39*, 197–216.
103. Fidel, R. Searchers' selection of search keys: III. Searching styles. J. Am. Soc. Inf. Sci. **1991**, *42* (7), 515–527.
104. Cronin, B.; Hert, C.A. Scholarly foraging and network discovery tools. J. Doc. **1995**, *51* (4), 388–403.
105. Xie, H.I. Supporting ease-of-use and user control: desired features and structure of web-based online IR systems. Inf. Process. Manage. **2003**, *39* (6), 899–922.
106. Rieh, S.Y. On the web at home: information seeking and web searching in the home environment. J. Am. Soc. Inf. Sci. Technol. **2004**, *55* (8), 743–753.
107. Bishop, A.P.; Van House, N.A.; Buttenfield, B.P. *Digital Library Use: Social Practice in Design and Evaluation*; MIT Press: Cambridge, MA, 2003.
108. Gilliland-Swetland, A.J.; Kafai, Y.; Landis, W.E. Integrating primary sources into the elementary school classroom: a case study of teachers' perspectives. Archivaria **1999**, *48*, 89–116.
109. Marchionini, G.; Crane, G. Evaluating hypermedia and learning: methods and results from the Perseus Project. ACM Trans. Inf. Syst. **1994**, *12* (1), 5–34.
110. Roderer, N.K.; Zambrowicz, C.; Zhang, D.; Zhou, H. User information seeking behavior in a medical web portal environment: a preliminary study. J. Am. Soc. Inf. Sci. Technol. **2004**, *55* (8), 670–684.
111. Hearst, M.A. *Search User Interfaces*; Cambridge University Press: Cambridge, U.K., 2009.
112. Chen, C.; Hernon, P. *Information Seeking: Assessing and Anticipating User Needs*; Neal Schuman Publishers: New York, 1982.
113. Menzel, H. In *Planned and unplanned scientific communication*. Proceedings of the International Conference on Scientific Information, Washington, DC, November 16–21, 1958; National Academy of Sciences, National Research Council: Washington, DC, 1959; 199–243.
114. Dervin, B.; Harpring, J.E.; Foreman-Wernet, L. Moments of concern: a sense-making study of pregnant, drug-addicted women and their information needs. Electron. J. Commun. **1999**, *9*, 2–4. Available at http://www.cios.org/www/ejc/v9n23499.htm.
115. Wilson, P. *Second-Hand Knowledge: An Inquiry into Cognitive Authority*; Greenwood Press: Westport, CT, 1983.
116. Hurd, J.M. Interdisciplinary research in the sciences: implications for library organization. Coll. Res. Libr. **1992**, *53* (4), 283–297.
117. Paisley, W. Information and work. In *Progress in Communication Sciences*; Dervin, B., Voigt, M., Eds.; Ablex: Norwood, NJ, 1980; Vol. 2, 113–165.
118. Taylor, R.S. Information use environments. In *Progress in Communication Sciences*; Dervin, B., Voigt, M., Eds.; Ablex: Norwood, NJ, 1991; Vol. 10, 217–255.
119. Cronin, B. Invisible colleges and information transfer: a review and commentary with particular reference to the social sciences. J. Doc. **1982**, *38* (3), 212–236.
120. Leckie, G.J.; Pettigrew, K.E.; Sylvain, C. Modeling the information seeking of professionals: a general model derived from research on engineers, health care professionals, and lawyers. Libr. Q. **1996**, *66* (2), 161–193.
121. Budd, J.M. Research in the two cultures: the nature of scholarship in science and the humanities. Collect. Manage. **1989**, *11*, 1–21.
122. Bates, M.J. The design of databases and other information resources for humanities scholars: the Getty Online Searching Project Report No. 4. Online CD-ROM Rev. **1994**, *18* (6), 331–340.
123. Orbach, B.C. The view from the researcher's desk: historians' perceptions of research and repositories. Am. Arch. **1991**, *54* (1), 28–43.
124. Duff, W.M.; Johnson, C.A. Where is the list with all the names? Information-seeking behavior of genealogists. Am. Arch. **2003**, *66* (1), 79–95.
125. Chatman, E. The information world of low-skilled workers. Libr. Inf. Sci. Res. **1987**, *9*, 265–283.
126. Chatman, E.A. *The Information World of Retired Women*; Greenwood Press: New York, 1992.
127. Chatman, E.A. A theory of life in the round. J. Am. Soc. Inf. Sci. **1999**, *50* (3), 207–217.
128. Metoyer-Duran, C. *Gatekeepers in Ethnolinguistic Communities*; Ablex: Norwood, NJ, 1993.
129. Harris, R.M.; Dewdney, P. *Barriers to Information: How Formal Help Systems Fail Battered Women*; Greenwood Press: Westport, CT, 1994.
130. Hersberger, J.A.; Murray, A.L.; Sokoloff, S.M. The information use environment of abused and neglected children. Inf. Res. **2006**, *12*(1), paper 277. (Available at http://InformationR.net/ir/12-1/paper277.html).
131. Kuhlthau, C.C. *Seeking Meaning: A Process Approach To Library and Information Services*, 2nd Ed.; Libraries Unlimited: Westport, CT, 2004.
132. Ellis, D. Behavioural approach to information retrieval system design. J. Doc. **1989**, *45* (3), 171–212.
133. Cool, C. The concept of situation in information science. Annu. Rev. Inf. Sci. Technol. **2001**, *35*, 5–42.
134. Courtright, C. Context in information behavior research. Annu. Rev. Inf. Sci. Technol. **2007**, *41*, 273–306.

135. Fisher, K.E.; Durrance, J.C.; Hinton, M.B. Information grounds and the use of need-based services by immigrants in Queens, New York: A context-based, outcome evaluation approach. J. Am. Soc. Inf. Sci. Technol. **2004**, *55* (8), 754–766.
136. Choo, C.W.; Detlor, B.; Turnbull, D. *Web Work: Information Seeking and Knowledge Work on the World Wide Web*; Kluwer Academic: Boston, MA, 2000.
137. Walter, V. Information needs of children. Adv. Librariansh. **1994**, *18*, 111–129.
138. Silverstein, J. Just curious: children's use of digital reference for unimposed queries and its importance in informal education. Libr. Trends **2005**, *54* (2), 228–244.
139. Trace, C.B. Information creation and the notion of membership. J. Doc. **2007**, *63* (1), 142–164.
140. Kling, R.; McKim, G. Not just a matter of time: field differences and the shaping of electronic media in supporting scientific communication. J. Am. Soc. Inf. Sci. **2000**, *51* (14), 1306–1320.
141. Wang, P.; White, M.D. A cognitive model of document use during a research project. Study II. Decisions at the reading and citing stages. J. Am. Soc. Inf. Sci. **1999**, *50* (2), 98–114.
142. Bishop, A.P. Document structure and digital libraries: how researchers mobilize information in journal articles. Inf. Process. Manage. **1999**, *35* (3), 255–279.
143. Covi, L.M. Material mastery: situating digital library use in university research practices. Inf. Process. Manage. **1999**, *35* (3), 293–316.