

3 Theoretical Constructs and Models in Information-Seeking Behavior

The bazaar of conceptual constructs created and used in information-seeking behavior (ISB) research offers a great variety of these items, such as theoretical constructs, conceptual and methodological frameworks, guidelines for analysis, and models of various kinds. Among the theoretical constructs, theories occupy the highest rank in the hierarchy of conceptual constructs. Yet the majority of the conceptual constructs in ISB are models, followed by theoretical constructs, of which theories are a rarity.

The lack of “good” theories has been a constant source of frustration to LIS researchers and to those in the field of information science in general. This failing is lamented because, it is argued, a well-developed and stable body of theories is a sign of a mature scholarly field. While some scholars may believe that information science is indeed still immature, others explain that this weakness is the result of other factors, such as having roots in a practical field (Järvelin and Vakkari 1990), being a postmodern, problem-based science (Wersig 1993), and being interdisciplinary (Nolin 2007). These explanations make sense, and there probably are additional reasons waiting to be discovered. To date, no systematic investigation has been conducted to find the sources for the lack of theory: Is it inherent to information science or just a phase in its development?

In addition to their contribution to the development of the field, the use of theories in research has practical advantages. Such use has the potential to do the following:

- Provide explanations for a project's findings
- Open new research directions
- Help guide research design
- Point to central research questions
- Resolve difficulties when conducting a study
- Provide a basis for comparisons with other studies

- Facilitate the identification of implications for other phenomena
- Pave the way for placing a study in a broader context.

Several studies have attempted to assess the maturity of information science and measured the percentage of journal articles in the field that used or developed theories (e.g., Järvelin and Vakkari 1993). Pettigrew and McKechnie (2001) comprehensively reviewed these studies and reported on an investigation of their own on the role, transfer, growth, and use of theory in information science. Their findings were much more optimistic than those of previous studies: 34% of the articles they analyzed incorporated theory, while older studies had found a range of 10% to 21%. It would be encouraging to be able to attribute this difference to a growth in theory building and use. Regrettably, even if this were the case, these studies cannot point to such a trend because each one of them has its unique interpretation of what a theory is, and therefore their results cannot be compared or integrated. In addition, while the previous studies used various flavors of positivist views, Pettigrew and McKechnie (2001) employed a broad definition of *theory* to free their project from the limitations of these views.¹ As a result, more conceptual constructs qualified as theories in their study than would have been the case in the others, which may partly explain the relatively high proportion reported in their study.

Another contribution of Pettigrew and McKechnie's (2001) study was an increased refinement of the analysis. They examined how many theories were developed within and for information science, how many were imported from other fields and disciplines, and which information science theories were picked up by researchers in other fields. They found, for example, that the social sciences were the largest source of theories that information science researchers imported (45% of all imported theories), and that information science theory is not heavily cited in other fields.

Many definitions have been put forward for the concept *theory*, and most were influenced by the theoretical traditions to which their originators have subscribed—whether explicitly or implicitly. To discuss them is a considerable task that is beyond the scope of this work. The community of human information behavior (HIB) scholars has also used the concept with plenty of different meanings, and a definition unique to the field is unattainable (and probably not desirable). A specific definition, however, is useful for this discussion of the various conceptual constructs in ISB because it helps to organize the presentation of the discussion, identify the conceptual constructs that can be considered theories, and examine their roles. I prefer to use Benton and Craib's (2001) definition of *theory*:

The attempt to explain phenomena by going beyond our common sense, everyday explanations, and beyond our immediate experience. (186)

This meaning is used throughout this book. With this definition in mind, this chapter addresses various conceptual constructs, such as laws, models, and conceptual frameworks, in addition to theories.

Researchers have neglected to study the prevalence of other conceptual constructs that are discussed in this chapter, such as laws and models. Although some of these constructs were considered as theories, and thus were counted in prevalence studies, no studies investigated the nature of, say, laws and models in ISB. Nevertheless, some of these constructs, primarily models, have had a marked impact on ISB research.

Human information interaction is a complex and multifaceted phenomenon that is influenced, to varying degrees, by issues such as cognitive and affective states; organizational, cultural, environmental, and social aspects; and technology and the nature and structure of the information source(s). Research in ISB has taken into consideration some of these aspects, resulting in three strands of research that reflect the lens through which researchers view their work: the psychological, the social, and the in-context lenses.

The *psychological lens* focuses primarily on the study of cognitive and affective aspects of ISB. It typically aims at general statements about people looking for information.

The *social lens* focuses primarily on the study of social, cultural, organizational, and political aspects of ISB. It typically examines patterns of information seeking among people in a particular social, cultural, organizational, or political group.

The *in-context lens* focuses on actors and their context, addressing various aspects that are relevant to the actors' activities when looking for information.

To date, the psychological lens has dominated the field. The use of the in-context approach has been on a steady rise, and the social lens is of growing interest to scholars in other fields but has only a humble presence in ISB research.

3.1 Theories in Library and Information Science

The scarcity of "good" theories in information-seeking behavior (ISB) is not for a lack of trying. Many researchers have attempted to build new theories, and others have borrowed theories from other fields and applied them to ISB research.

3.1.1 "In-house" Theories

Although a number of LIS scholars have tried to develop theories in ISB that were unique to the field, only a few of these trials have yielded theories in the sense used in this book. Nevertheless, these trials at building theories have produced other

conceptual constructs, such as laws and frameworks to guide research (see section 3.2), and their value for research is not affected by their conceptual status. An example of such a construct is Kuhlthau's (2004) "uncertainty principle," which makes the claim that uncertainty generates feelings of anxiety and a lack of confidence. This statement, however, reflects an immediate everyday experience, and for reflective people might even be in the realm of common sense. I am anxious when I am uncertain about the safety of a place I visit, or when I do not know how high the gas prices may climb before my summer vacation. When I prepare for teaching a new class and am uncertain about the students' reaction, I feel a lack of confidence. This principle, then, is better classified as a law, rather than a theory (see section 3.2.2).

Even though many constructs designated as theories by their originators do not qualify as such under the above definition, a few bona fide ones have grown in the field of ISB. Most of these theories were developed through years of empirical research, with each project guiding the development of a theory through validating or rejecting a statement, expanding or modifying it, or bringing to light new concepts and relationships.

Some examples are the works of Diane Nahl, Eliza Dresang, and Katriina Byström. Nahl's (2007) affective load theory, which has been 20 years in the making, identifies people's underlying habits of thinking and feeling while they are engaged in interaction with information. It explains seeking behavior from the actor's point of view, claiming that the thoughts and feelings of individuals affect observable behavior, such as selecting a search strategy or thinking about a synonym. Based on a string of research projects about the information behavior of children and young adults, Dresang (1999) constructed the radical change theory, which addresses the changes that have occurred in the digital age. This theory explains that information behavior in the digital age can be understood, or explained, by considering three principles: interactivity, connectivity, and access. Other theories are still in the development stage. Byström, for instance, is nurturing the progress of her theory on information activities in work tasks. She wants her research to be relevant to real-life work contexts and, therefore, studies the effects of various attributes of the task for which information is sought (e.g., task complexity) on searching behavior (Byström and Hansen 2002).

The most notable LIS theorist in HII was the late Elfreda Chatman, who centered her attention on the "information poor" (even those among members of the middle class) and their interaction with information in everyday use. Chatman examined HII as an integral part of the social lives of her participants; she saw HII as being shaped by people's social conditions, while also contributing to those conditions and their

sustainability. The first researcher to consistently apply theories and methods from the social sciences, Chatman erected a theoretical structure in which the guidance of theories and concepts in conducting an empirical study has borne the seeds of new theories and concepts. Of particular significance to the development of the new constructs were the patterns she observed that could not be explained by the theories she used to analyze them. One of her most important contributions to the field is the empirical evidence that cultural and social norms affect the ways people interact with information or ignore it.

Chatman investigated particular groups of people: those who inhabited a “small world,” which she defined as

[a] world in which everyday happenings occur with some degree of predictability ... [and] it allows for the presence of the “legitimized others.” [That is,] people who share physical and/or conceptual space within a common landscape of cultural meaning. Within the contextual understanding of information behaviours, the legitimized others place narrow boundaries around the possibilities of these behaviours. (Chatman 2000, 3)

Because the information poor were the object of her studies, Chatman explored several small worlds, one after the other, in which people avoided information sources and information that directly addressed problematic situations they had experienced.² Each small world exposed its own social conditions and forces that had shaped the information behavior of its inhabitants, and brought to light new insights.

Poor women who had temporary employment as part of their participation in a training program composed the first small world she investigated (Chatman 1986). In this study Chatman applied diffusion theory from anthropology and sociology to the diffusion of information among the women. When she found that the theory did not explain all her findings, she focused on the cases that could not be explained. This investigation led to several observations, such as the competition among the women that served as a barrier to information sharing, and the discovery that some types of information decreased in relevance and value the longer they were in the process of being diffused.

Her next study participants were selected because they formed a stable small world that was convenient to study: janitors who worked at the university where she was a faculty member (Chatman 1987). Chatman followed the same barriers to information sharing she had discovered in the first study, and applied alienation theory—which emphasizes secrecy and self-protection—to the new study. This exercise led her to discover additional barriers. Furthermore, since the second small world was situated within a stable and long-term institutional setting, this environment raised her curiosity about the effects of the institution on the janitors’ information behavior. To

investigate this variable, she applied gratification theory. A clear issue stood out among her findings: The janitors avoided information sources even when the sources could potentially be helpful to them. They believed they did not need information because they felt that their lives were governed by fate, and there was nothing they could do to change things. This study broke new ground by introducing the concept of *avoiding information* to the vocabulary of HII research from the social perspective, a research area that up to that time had recognized only *seeking information*, assuming that people always look for information when they need it.

After completing the first two studies, Chatman thought that applying social network theory might provide new insights because of the prominence it gave to sharing among network participants. This time she studied aging middle-class women in an assisted living facility (Chatman 1992). Although the theory failed to provide new insights as expected, the result of the study encouraged her to begin building her own theories. She named the first theory a *theory of information poverty*, which she used to explain the ways people defined their life experiences in order to survive in a world of extreme distrust.

While no new theoretical insights were gained in the study of the aging women, it drew Chatman's attention to the importance of two concepts about life in a small world: *social norms* (the standards that determine acceptable behavior) and *self-protective behavior* (Chatman 1996). To further investigate these concepts, she embarked on a study of women in a maximum-security prison, exploring the information sources that identified and sustained "normative" life for the prisoners (Chatman 1999).

This investigation expanded and enriched her understanding of social norms and self-protective behavior and led to her next two theories. The first, a *theory of life in the round*, explained behavior in relation to three concepts: (1) social control (the element that binds the prisoners' small world together), (2) social types (the norms that govern one's public behavior), and (3) worldview (a collective perception that members of a social world hold in common regarding those things that are important and those deemed trivial or unimportant) (Chatman 2000). The second theory, *living life in the round*, included six propositions that explained various aspects of "life in the round," which is life that is taken for granted and with an enormous degree of imprecision but accepted levels of uncertainty. This theory explained the relationships and tradeoffs between social norms and self-protective behavior. Examples of the phenomena explained by the propositions include the results of establishing appropriate behavior, the effect that the force of social norms has on private behavior, and the conditions that have to be met in order for individuals to cross information boundaries (Chatman 2000).

Chatman's three theories had culminated in a more general theory: a *theory of normative behavior*. Four concepts played a central part in this theory:

1. "Social norms" (and their value for a small world),
2. "Worldview" (which is shaped by normative values),
3. "Social types" (the process of assigning people to a type according to their predictable behavior in everyday life), and
4. "Human information behavior" (which is shaped by what members of a small world believe is necessary to support a normative way of life).

In this context Chatman defined information behavior as "a state in which one may or may not act on the information received" (Chatman 2000, 12).

Although Chatman's work was stopped by her sudden death, her theories and conceptualizations have had a great impact on numerous researchers in LIS, many of whom employed them in their studies. Regrettably, at times her ideas have been applied too broadly, and researchers transferred her insights into other settings that might not correspond with the type of small worlds she studied. Chatman had clearly explained the nature of the context for which her theories and concepts had matured. While they offered robust explanations for the HII of the information poor, their potential to explain HII of the information rich is very limited, if relevant at all. The concept *small world* was associated with concepts such as *deception*, *secrecy*, *social control*, and *self-protective behavior*—concepts that would probably not be associated with, say, the world of a country club's members. In addition, Chatman targeted a well-defined type of information:

I am speaking of a particular type of information, one that is intended to respond to the needs of individuals within a specific social context. That is, the information sought to respond to problematic needs is a different type of information from that which is intended for everyday casual use. (Chatman 2000, 10)

Like many studies in the social sciences, Chatman's work was moored in a definite social context and cannot be meaningfully transferred to others, or to the cognitive realm, without conducting cautious and thorough investigations to demonstrate its applicability.

Chatman's contributions to research in LIS have moved the field forward significantly. She was among the first to use qualitative research methods that produced "thick descriptions"—narratives that richly describe the phenomenon of study—and to demonstrate the respect, genuine interest, and understanding that study participants deserve, especially when they are members of marginalized groups. She demon-

strated the richness of description and insights to which investigations in context can lead, which “legitimized” in-context studies and encouraged new researchers to consider them for their own work. Most notably, she offered a fine example for theory development through iterations between empirical and theoretical investigations.

Well-established theories that have guided researchers in ISB are in short supply. The theories that have been developed show that to develop a theory requires a long time and much intellectual effort, which can be materialized only with adequate support. Unfortunately, the area of ISB has not attracted funding at the level required for the in-depth empirical research that is the basis for theory development. Nevertheless, the few existing theories and those that are being built provide excellent examples of research processes that can lead to theory development.

3.1.2 Borrowed Theories

While Chatman employed theories from the social sciences to build theories in LIS, numerous researchers borrowed theories from other fields to guide their empirical research projects, most of which were not meant to lead to theoretical developments. Baker (1994), for example, employed monitoring-and-blunting theory from psychology, which explains behavior under stress, to study information seeking by women with multiple sclerosis. Limberg (1999) as well as Christine Bruce (1997) and Kirk (2002) applied phenomenography from the field of learning to their studies of information behavior. Limberg examined the information seeking and use of high school students, Bruce studied information literacy, and Kirk investigated the information use of managers. Another example of a borrowed theory is social positioning, which originated in psychology, and guided Given’s (2002) research project about the information behavior of undergraduate students.

Not all researchers made the most of the theories they had imported. Picking and choosing elements of a theory, rather than using it holistically, is not that rare in ISB research. Generally speaking, one hopes that when a theory guides a research project, both the conception and methodology of the project fit the theory and that all of the project’s components preserve the context, meaning, richness, and robustness of the theory. For instance, when using constructs from diffusion theory, it is best not to overlook the social context. Similarly, if researchers ignore the constraints on behavior in optimal foraging theory when they apply it to information seeking, they change the meaning of the borrowed concepts they use and reduce the reliability of the theory transfer.

In addition, at times, rich and complex theories are used to “discover” new insights that are rather commonsensical. For example, is it necessary to find empirical evidence

to demonstrate that information seeking is a complex process or that experience in information seeking shapes a person's seeking behavior?³ Although the determination of what is common sense and what requires evidence or theoretical backing is shaped by a researcher's experience and point of view, it is easy for researchers to ignore this issue, regardless of their approach. The differentiation between the obvious and a new insight is a particularly sensitive issue in ISB because of the relationships between the theoretical and the practical dimensions. Practitioners with experience in helping people when they look for information collect observations about this behavior, which are validated over time. Researchers who lack such experience may rediscover one of these observed behaviors and consider it to be a new insight. In such cases, experienced information professionals are likely to perceive such a "discovery" as additional evidence of the irrelevance of academic research to their work. Ignoring knowledge gained by practitioners thus affects the quality of research and widens the gap between theory and practice.

One exception to the patterns of theory use is the work of Marcia Bates, which has had a worldwide influence on HII research in LIS and in other fields. Unlike Chatman, who drew on theories from sociology and anthropology, Bates has been inspired by theories from a range of disciplines. Her work has been mostly conceptual and has focused on concepts and ideas central to information science in general and to ISB specifically. She was the first to examine basic concepts in the field, such as search and idea tactics (Bates 1979a, 1979b), and has analyzed the concept of information (Bates 2005), the nature of information science (Bates 1999), and the different roles that humans and machines can assume during an HII process (Bates 1990), along with the analysis of other concepts and phenomena. Her work has developed with a bit-at-a-time expansion of concepts covered and theories employed, which is typical for a "berrypicking" course—a pattern of searching she had identified (Bates 1989).

A few examples can illustrate Bates's use of theories. To propose a design model for subject access in online catalogs, Bates (1986) imported concepts from Heisenberg's "uncertainty principle" in physics' quantum theory (she used the original principle, which is very different from Kuhlthau's) and from Ashby's Law of Requisite Variety in cybernetics. Applying these concepts to searching and other activities such as cataloging, she concluded that generally "the system should help the searcher enter the system, get oriented, and generate the necessary variety" (Bates 1986, 12). Based on the specifics of her analysis she then offered suggestions for the design of some system components. In her keynote address at the Information Seeking in Context (ISIC) conference in 2002, Bates initiated an idea for an integrated model of information seeking and searching (Bates 2003). Her model calls for an understanding of several

levels of human existence that intersect with various disciplines in the natural and social sciences as well as the humanities. Following an evolutionary tradition—manifested in approaches such as human behavioral ecology, evolutionary culture theory, and evolutionary psychology—she laid out in a hierarchical order the levels that required attention, starting with the chemical, physical, geological, and astronomical level, and reaching the top with the spiritual one. Bates (2007) also conducted an in-depth analysis of the search strategy *browsing* and constructed a new definition for it, for which she found support in research in psychology and behavioral ecology about visual search and about curiosity and exploratory behavior.⁴

The variety of theories that Bates used in her studies also distinguishes her work, for most of the other importers of theories in LIS preferred to use a single theory in their research. Typically, each theory was transferred and used by only one researcher. The geographic locations of the research importers are also few in number. Several theories have been imported for doctoral research projects at the University of Western Ontario in Canada, where the use of a theory in a dissertation is required, and the others took place in Europe and Australia, where a theoretical approach to research is common. The diversity among the theories that have been imported is great, and there seems to be no common conceptual thread among them. To date, we cannot point to one theory from another field that has had a major impact on ISB research.

3.2 Other Theoretical Constructs

Theoretical constructs are unique in the assortment of conceptual constructs because they have a direct association with the concept of theory—unlike other constructs, which may develop relations with theories but these theories are not essential to their being. Three types of theoretical constructs have emerged from ISB research: approaches, laws, and named concepts.

3.2.1 Approaches

When a theory is already in place, scholars may add other constructs to it and create an *approach*, which is a comprehensive view of a phenomenon (or the world) that implies a research methodology and tools. For example, after conducting some empirical studies guided by several theories, Diane Sonnenwald (1999) has created such an approach, which she named “information horizons.” The theoretical framework included five propositions. Among these, the first proposition stated that human information behavior is shaped by and shapes individuals, social networks, situation,

and contexts; and the fourth claimed that human information-seeking behavior might, ideally, be viewed as an individual's collaboration with information sources. She explained: "The information horizons theoretical framework and methodology proposes a universal, descriptive explanation of human information-seeking and use behavior, and data collection and analysis techniques to explore human information-seeking behavior in context" (Sonnenwald 2005, 191).

The concept *information horizons* is central to this approach because it constrains and enables information seeking.⁵ Sonnenwald (2005) defined it in order to study issues such as the reasons that people access (or do not access) individuals and other information resources, or the impact of contexts and situations on the information-seeking process. The methodology included in this approach charts in detail the processes of data collection and analysis to be used in ISB studies.

A much more complex and refined approach has been developed by Brenda Dervin, who is a leading scholar in ISB. A scholar in the communication field, she has developed a "sense-making methodology"—the most comprehensive approach for simultaneously addressing methodology, method, metatheory, and substantive theory. Her approach has been applied widely by other researchers around the world to investigate various phenomena. Dervin's web site (<http://communication.sbs.ohio-state.edu/sense-making/>) shows that researchers in fields such as disability studies, telecommunication policy, pedagogy, and information seeking have applied her approach. Her chapter in the 1986 *Annual Review of International Science and Technology* (Dervin and Nilan 1986) is considered to mark the turning point from a system-centered to a user-centered approach (even though user-centered studies had been carried out before that date), and she is considered the instigator of what is called the "user-centered revolution."

Like Bates's work, Dervin's was influenced by many theories and theoretical traditions. Unlike Bates, however, her work has focused on one concept, that of *sense-making*, which emerged in the phenomenological tradition (Dervin and Naumer 2009). From this concept she has developed a full-blown approach (Dervin 1992), influenced by the works of several philosophers such as Bruner, Derrida, Dewey, and Foucault. Her work has centered on developing theoretical guidance on methods for such activities as theorizing and conducting empirical research. Sense-making focuses on how people understand information they receive within their life context, with factors such as the person's expertise, social position, and situation affecting their understanding. Dervin has been developing the approach over the last 30 years and continues to enrich and expand its conceptual construct.

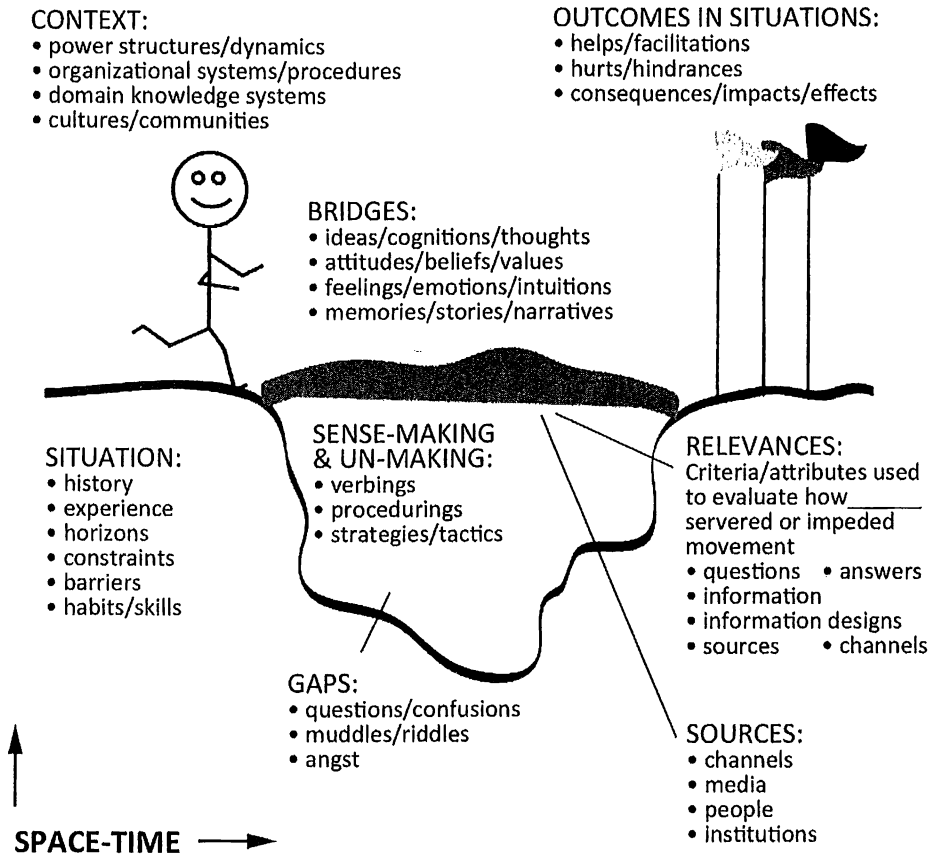


Figure 3.1

Dervin's sense-making methodology metaphor. Reprinted with the permission of Brenda Dervin.

Figure 3.1 is a graphic presentation of the theoretical foundations of Dervin's approach. Simply put:

1. A person goes about her life, which is embedded in a certain dynamic context and situation, taking step after step through experiences.
2. A sense-making moment occurs when she arrives at a gap in the road: She cannot continue without changing her sense of the world or creating a new understanding of the world.
3. To move to a new situation, she needs to build a bridge, or she may decide to "unmake sense," that is, to change her sense of the world without building a bridge.
4. For that purpose she can get help from various sources of information.

The sense-making methodology is rich and complex. It cannot be summarized in one article, and definitely not in this chapter. However, no account of the approach can ignore the method Dervin (1992) developed for investigating information needs: the “micromoment timeline interview.” Following this method, a researcher asks the participant in an interview to reconstruct a situation in terms of what happened, and then the researcher asks questions about the situation. The questions are directed by three major themes: how the person saw the situation, the gap, and the help she wanted. This method has been integrated into many studies in ISB and in various modes, as well as into research projects in other areas.

3.2.2 Laws

Laws have value as independent statements, but they can also serve as building blocks for a theory. In the positivist tradition, a law is defined as a regular event sequence. Following this definition, several of the constructs designated as theories become laws.

Kuhlthau’s law regarding uncertainty, for example, has roots in her model, the information search process (see section 3.3.1), which examined the information seeker’s feelings, thoughts, and actions at each stage of the search process (see figure 3.5). This model has guided several of the research projects that led her to develop a law—the uncertainty principle—which states that uncertainty (which is a cognitive state) generates feelings of anxiety and lack of confidence (Kuhlthau 2004). It should be noted that the use of the concept *uncertainty* is different from the one first introduced to information science; it was originally used in the context of the attempts to define *information* as that which reduces uncertainty. Kuhlthau explained that information did not always reduce uncertainty; in fact, at times it could create new uncertainties. She placed the concept in a dynamic context to reflect the cognitive uncertainty about the process and its success that people have when they look for information. Currently, the concept *uncertainty* is enjoying a revival, accepting various meanings and being discussed primarily among researchers with the in-context lens.

Other examples of laws can be derived from Sonnenwald’s (2005) propositions. For instance, the first one (“human information behavior is shaped by and shapes individuals, social networks, situations, and contexts”) claimed several regular sequences (Sonnenwald 2005, 192). That is, the social network of a person will shape his information behavior, and his information behavior will shape his social networks. This formulation of the laws can be repeated for the situations and the contexts in which a person is placed. The second proposition can be considered a law if we relax the definition of *laws* to include “tendencies of causal mechanisms—which may or may not be expressed in the form of observable regularities” (Benton and Craib 2001, 182).

The second proposition was, “Individuals or systems within a local situation and context may perceive, reflect, and/or evaluate change in others, self, and/or environment” (Sonnenwald 2005, 192). Reformulated as a law, it could claim that a tendency exists among individuals or systems to perceive, reflect, or evaluate changes around them when they are placed in a local situation and context.⁶

In the positivist sense, laws have predictive power, and therefore have explanatory power. With these powers they can guide and support studies carried out in the positivist tradition.⁷

3.2.3 Named Concepts

As an embryonic stage in building a theoretical construct, a scholar may define and name a concept and conduct studies about it, exposing its characteristics and importance. From among the variety of such concepts in ISB, three serve as examples.

The concept *imposed query* was introduced by Melissa Gross (1995). Imposed queries describe the situation when one person has an information problem and asks someone else to find the information that will resolve the problem. When a person searches for information to fulfill her mother’s request, or when a librarian looks for information for a patron, they are executing searches for imposed queries. In her investigations of seeking behavior with such queries, Gross identified the variables that determine success in the resolution of imposed queries, defined the life cycle of impositions in the context of elementary school, and examined the implications of the imposed queries for the evaluation of library services (Gross 2005).

Two more recent concepts are *information grounds* and the *PAIN hypothesis*. Karen Fisher (formerly Pettigrew) borrowed the concept *grounds* from the lore of fishermen during her dissertation research project on community foot clinics for the elderly, in which nurses and other individuals shared health information. She defined *grounds* as “environment[s] temporarily created when people come together for a singular purpose but from whose behavior emerges a social atmosphere that fosters the spontaneous and serendipitous sharing of information” (Pettigrew 1999, 811). Through her subsequent research, Fisher identified seven concepts key to information grounds—*context rich*, *temporal setting*, and *social interaction*, among others. Her latest work has been dedicated to uncovering places that are information grounds and to finding the most common information grounds (Fisher, Naumer, et al. 2005).

Harry Bruce (2005) constructed the concept PAIN (personal anticipated information need) in the context of personal information management, to introduce the motivation and underpinning framework for information behavior in that context. More specifically, the PAIN hypothesis is related to a person’s thoughts and actions when

building and maintaining a personal information collection, which is the space individuals turn to first when they need to resolve an information need. A personal collection may include paper documents, notes, calendars, lists, website bookmarks, and people. PAIN has five propositions that Bruce introduced as a conceptual framework to propose that researchers engage in further study, continue to explore the concept, and validate or correct a proposition through empirical studies; hence the PAIN hypothesis.

When constructing concepts, scholars often neglect to ensure the rigor of their concept's definition. One such example (among quite a few others) is the concept of *imposed query*. Can the definition given by Gross discriminate between imposed queries and self-generated ones? As one example of an imposed query, Gross (2001) cites the queries students use to complete a class assignment. In this case, where does the information problem lie? Certainly not with the teacher; he does not expect the students' assignment to solve his problem. But, on the face of it, it does not lie with the students, either; they have not generated the information problem. On the other hand, one may claim that all students' queries are self-generated. They may look for information because they want to learn something new, to receive a high grade, to finish the assignment and get the teacher off their back, or to impress a classmate, among other reasons. All these goals are self-generated. Therefore, there are no impositions in this case, but rather constraints. The students, for instance, have to look for information that will help them satisfy the assignment's requirements; they may not be allowed to ask for help, and so forth. This constrained environment is not a special situation, as every information problem has its constraints. In sum, the definition of *imposed query* is not rigorous enough for other researchers to give it meaning and to use the concept in their work. Once rigorously defined, new concepts are seeds that may sprout and bloom into more complex theoretical constructs.

3.2.4 Theoretical Constructs: Conclusions

The area of ISB is blessed with many theoretical constructs of various types. It is possible that scholars took to heart the scarcity of "good" theories in this young field, rolled up their sleeves, and worked to move the field forward. These efforts, however, did not lead to a cumulative body that integrates constructs or defines relations among them. In this undertaking, it is easier for a scholar to find her own niche—create her own new concept, method, law, or theory—than to offer contributions to the perceptions of basic concepts in ISB that have already been investigated and theorized about. The map of theoretical work in the field indicates that many scholars opted for the easier road.

3.3 Action and Element Models

A *model* is defined here as a representation of a segment of reality. It may represent a real reality—for those who think that there is reality independent of our perceptions—or a perceived one.⁸ A city map, for example, may be accepted as a representation of a city that exists whether or not we have ever heard its name, but Dervin's graphic presentation of the sense-making methodology metaphor (figure 3.1) is a representation of a concept—a thing that cannot exist independent of our perception. Similarly, a model can represent observable reality or one that is inaccessible to observation. One can observe, for instance, the thoughts of an actor when searching for information (by asking her to think aloud), but he cannot observe her general state of knowledge. Yet both can be represented in models.

The LIS community commonly assumes that models must have some type of graphic presentation. Indeed, most models in HIB are presented in a diagram form. As a representation of a segment of reality, however, a model may have various forms, such as mathematical formulas, artifact, or narrative text. In this sense of the concept *model*, most empirical studies in ISB create models because their findings represent a part of the actual reality of information-seeking behavior. Some represent behavior of people in general (common among cognitive studies) and others represent that of specific groups (identified by social and/or other context characteristics). The form researchers most often use to represent this reality is a narrative text, or research report. Such reports, which may also include drawings and formulas, are not labeled as “models” by their creators, even though they are models in the broad sense of the concept. This section addresses the limited interpretation of the concept and focuses on constructs that were identified as “models” by their originators. That is, the term *model* is limited in this section to this type.

Models in ISB can be divided according to the dimension of reality they represent: *action models* represent activities during information seeking and, at times, even before and after; *element models* represent elements that shape information seeking (or, to translate into positivist language: models that represent the variables affecting information seeking). Other models—*mixed models*—include both; some side by side, others in an integrated fashion. The method by which models were constructed is not uniform either. Similar to theoretical constructs, some of the models have been developed through empirical research, and others were based on theoretical foundations with plans to empirically test their relevance.

3.3.1 Action Models

Action models represent activities during information seeking in a variety of styles. Some represent the search process with ordered successive activities, others are two-dimensional diagrams that add a representation of the relations between the activities, and yet others list activities in no specific order.

The first prominent model was created by Robert Taylor (1968), who represented the flow of activities during a search process, mainly in the library context. This model focused on activities occurring before the actual direct interaction with information, with three decision points (the square boxes) in which the actor decides what to do next (figure 3.2). The main purpose of the model, which Taylor based on interviews with special librarians and on his own experience, was to help librarians to structure reference interviews. The next model he presented for that purpose delineated the five aspects that are necessary for understanding a query: (1) determination of subject; (2) objective and motivation; (3) personal characteristics of the inquirer; (4) relationships of inquiry description to file organization; and (5) anticipated or acceptable answers (Taylor 1968, 183). Taylor explained that the listing is approximately in the order of occurrence.

Michael Eisenberg and Robert Berkowitz (1990) developed a model of the same type—dubbed the *Big Six*—that included six successive steps guiding actors as they go through the process of solving an information problem. From beginning to end, the steps are: (1) task definition; (2) information-seeking strategies; (3) location and access; (4) use of information; (5) synthesis; (6) evaluation. This model was created to support teaching information literacy in elementary schools and was based on the creators' experience in addition to anecdotal and informal evidence. It has been expanded to other educational settings and is already used in the educational systems of several countries.

James Krikelas (1983) created a model similar to Taylor's graphic presentation of the first stages in information seeking. His is the first holistic model to be published that points to various information sources—including memory and observation—and that lays out the process from the need-creating event and environment to information gathering and giving (figure 3.3). Krikelas's model is also among the first to represent information seeking in general, stepping away from the traditional approach at the time, which had focused on libraries and educational settings, and providing the groundwork for future theories and models in ISB.

Dagobert Soergel (1985, 15) took a similar, general approach when he developed a model for the acquisition and use of information that analyzed information seeking in the context of decision making, which he perceived to be the goal of information

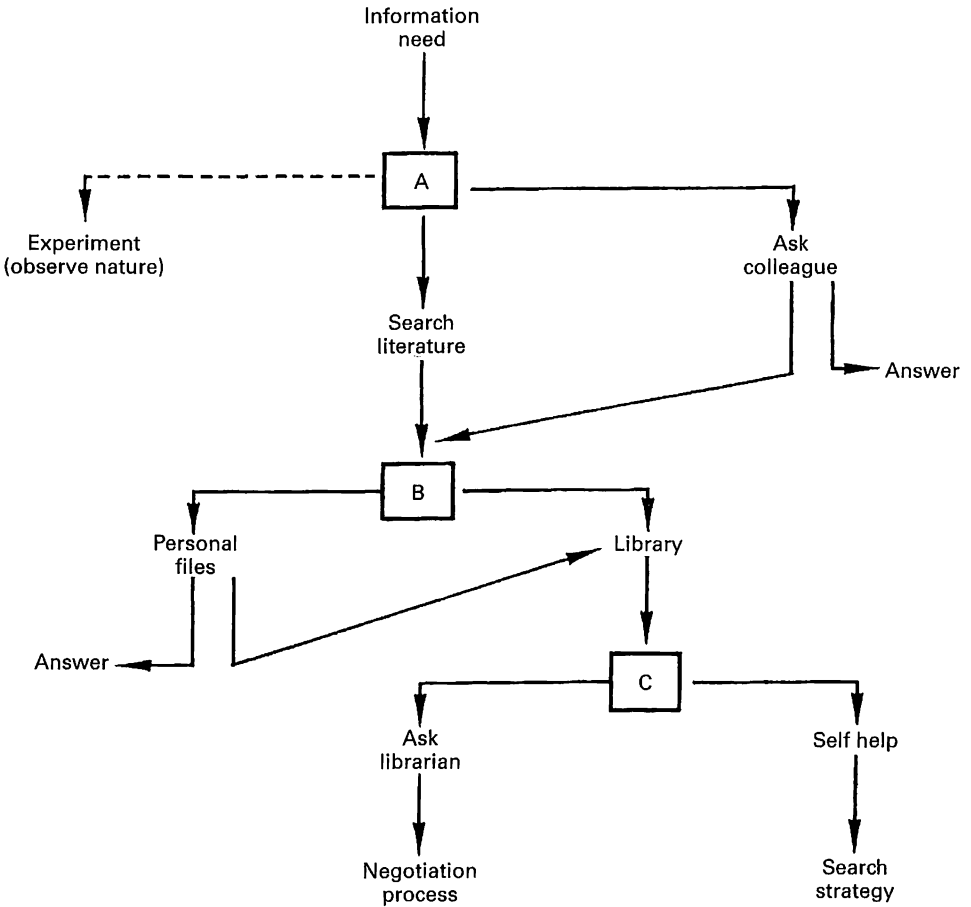


Figure 3.2
Taylor's (1968) model of prenegotiation decisions by the inquirer. Source: American Library Association.

seeking and use (figure 3.4). Because decision making is a cognitive process, the model placed the cognitive process in the center of human activities. Moreover, it explicitly recorded tacit activities during this process, such as the processing and interpretation of ideas and updating the seeker's image of both the actual and the desired states of affairs. Soergel's model expanded on the previous models in additional ways. Unlike earlier models, its aim was to be highly general in order to fit information seeking in both databases and text-retrieval systems.⁹ In addition, it incorporated information use as an integral part of information seeking, since it represented situations in which

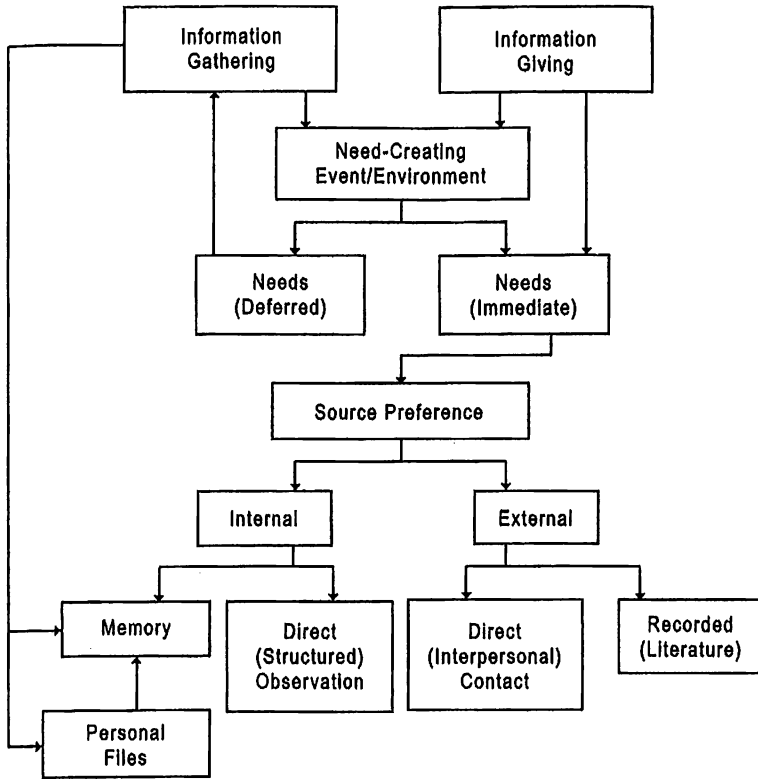


Figure 3.3

Krikelas's model of information seeking. From Krikelas (1983); reprinted with the permission of College of Information Science and Technology, Drexel University.

actors use information retrieved to continue the search. The model also covered situations in which a decision is made without looking for information at all, and in which an information need is resolved without the use of external information sources. At the time of its publication, it was the most universal and detailed model of seeking information.

These first models to represent a complete picture of the seeking process were based primarily on personal experience and laid out an ideal process with its alternatives. Kuhlthau (1991) was the first to study the seeking process empirically and systematically, with a beginning, a middle, and an end. Her model—the “information search process”—has drawn much attention and supported the work of a number of LIS scholars (see, for example, T. D. Wilson et al. 2000). She based the model on a

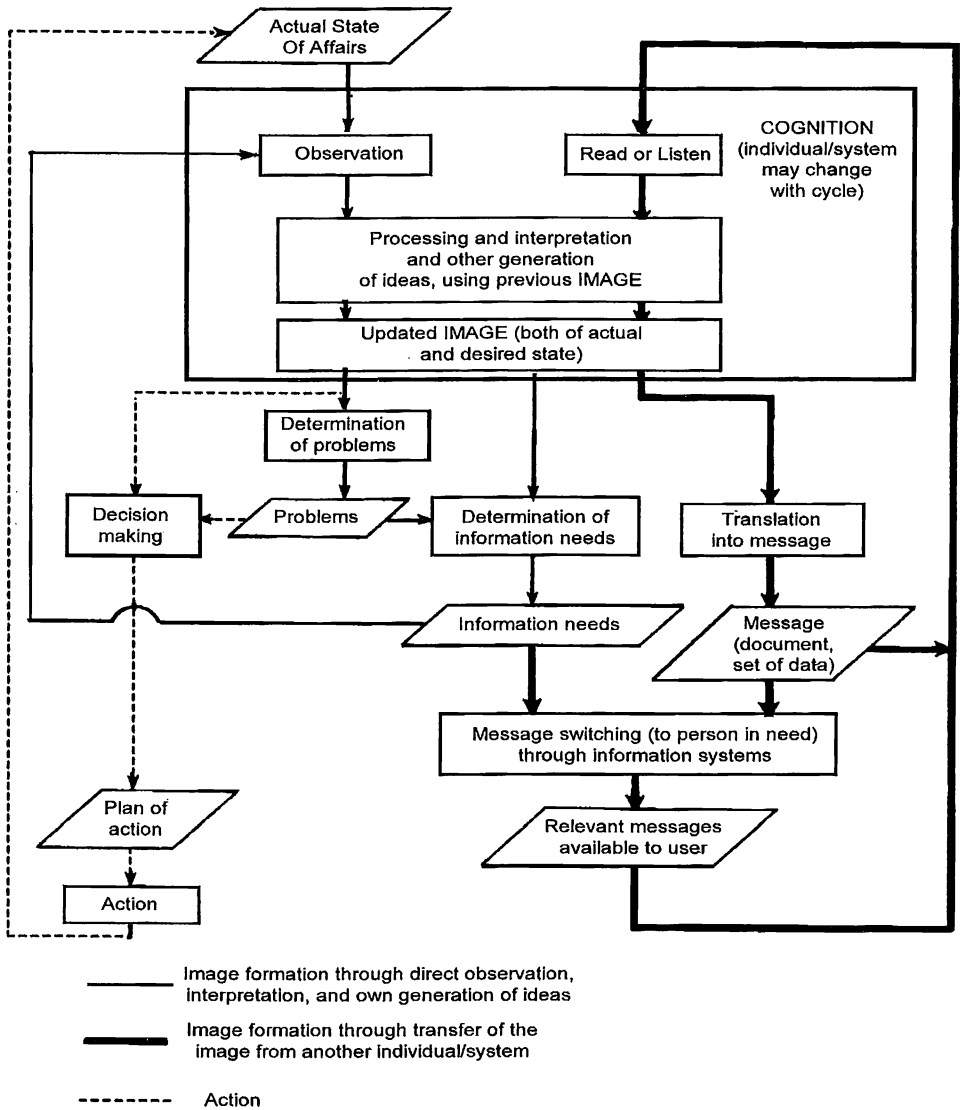


Figure 3.4

Soergel's model for the acquisition and use of information. From Soergel (1985), 15; reprinted with the permission of Elsevier.

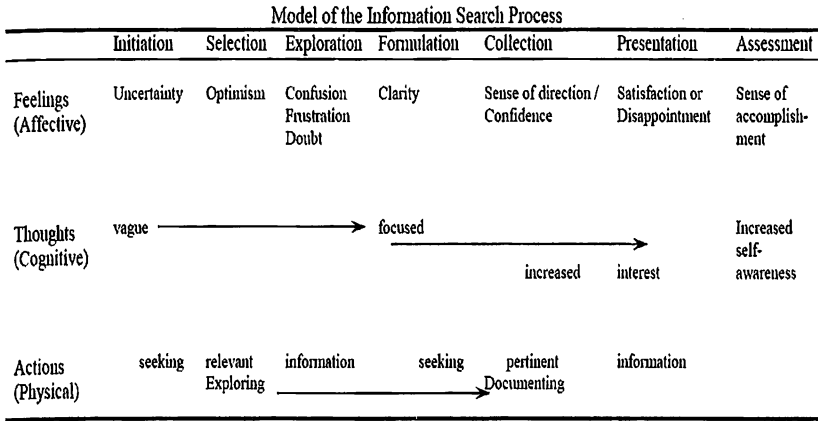


Figure 3.5

Kuhlthau’s model of the information search process (ISP). Source: http://comminfo.rutgers.edu/~kuhlthau/information_search_process.htm

longitudinal, term-long study of high school students who were in the process of writing a paper as a class assignment. Kuhlthau (1991) applied the work of the psychologist George Kelly on personal construct theory, which inspired her to study the actor’s experience. The stages Kelly identified in the process of personal construction of meaning and the role of cognitive and affective aspects provided the basis for the empirical study that generated Kuhlthau’s model (figure 3.5). Like Dervin, she continued to work on the concepts and relations she found in the first empirical study and went on to enrich it through several subsequent studies. This work led her to formulate the uncertainty principle.

Kuhlthau’s novel contribution to ISB went beyond her linear description of the search process. In her studies she investigated the transformations of three facets within the progression of the search process: the affective (feelings), the cognitive (thoughts), and the physical (actions). Explaining that people experience the search process holistically, she presented the interplay of these three facets by following their transformation during the process along parallel lines. Unlike many of the previous models, hers was not purely a behavioral one since it represented feelings and thoughts.

One should note that the information search process model was based on a study of high school students in a distinct context: they searched for information to help them write a paper that was assigned in a specific class and that required the students to select a topic. Not surprisingly, the stages in the model reflect the process of preparation for writing such a paper, and thus may not reflect seeking processes in other

situations. Although Kuhlthau did not claim the model to be general, quite a few researchers accepted it as a model that applies to any search process—possibly with the encouragement of the universal nature of its name. Also, a few researchers who were aware of the context tested the model on *university* students in similar situations and modified it to describe the college students' search processes (e.g., Vakkari 2001). Others had concluded that the model required modifications in order to be applied in the environments they studied (e.g., Hyldegård 2006; Rose 2006). Kuhlthau (1997) herself employed it in her study of the information behavior of a securities analyst. These studies may serve as the first steps in generalizing the information search process model. Because the model is context dependent, many additional tests in various other situations will be required to gradually build its generality.

Another departure from the traditional action models of information seeking was introduced by David Ellis (1993). Rather than representing seeking as a sequence of activities, he identified types of activities that may occur at any stage of the seeking process, such as chaining (following chains of citations or other forms of referential connection between materials), browsing (semidirected searching in an area of potential interest), surveying (familiarizing oneself with the literature of the area), and verifying (checking that information is correct). His first iteration of the model was the result of an empirical study of the information-seeking behavior of academic social scientists. He then expanded the model through studies of other actors, such as English literature researchers and physicists as well as engineers and research scientists in industry. Each study revealed the use of at least some of the activities in the initial model and added new ones. The model has become more general with each new group of actors Ellis has studied. It is purely behavioral, focusing on directly observable activities.

Action models in ISB have been molded in various forms, from a two-dimensional graphic representation of sequences and possible activities to the identification of types of activities. It is undesirable, however, and maybe impossible, to pull them all together into one grand model. Not only do the models have different forms, which raise barriers to blending, but integrating the activities would also result in a structure with internal conflicts and inconsistencies, and it might be too big to be relevant to the field.¹⁰ But on a positive note, the plurality of models offers a diversity of choices for scholars who wish to consider action models in their work.

3.3.2 Element Models

Element models lay out those elements involved in information seeking that their creators deem central to the phenomenon. These elements may be ones that shape

the process, are shaped by it, or both. For instance, a model that indicates that information seeking is affected by the complexity of the decision for which information is required, and the urgency of the task for which the decision is required, is a model with two elements—in this case, two factors that shape information seeking. Only a few models represent elements of information seeking exclusively. Three such models have been heavily discussed in the ISB literature: Nickolas Belkin's (1980) model, which was purely cognitive; Peter Ingwersen's (1999) model, which was primarily cognitive but introduced some socio-organizational elements; and Gloria Leckie and Karen Fisher's model (Leckie and Pettigrew 1997), which was strongly socio-organizational.

Belkin's and Ingwersen's models were originally constructed for the information retrieval (IR) community and, therefore, used the term *information retrieval* instead of *information-seeking behavior*. Both models were cognitive and conceptually more comprehensive than other models; they represented information systems as well as information seeking, and dealt with them as equal partners.

In the *anomalous state of knowledge* (ASK) model, Belkin (1980) approached information seeking with the view that the process was initiated by the actors. To the questions of when and why actors look for information, he answered: when they have an anomalous state of knowledge (see figure 3.6), which occurs when a person's knowledge is not adequate to resolve an information problem. He further noted that most approaches in the field assumed that people knew what information they were seeking.

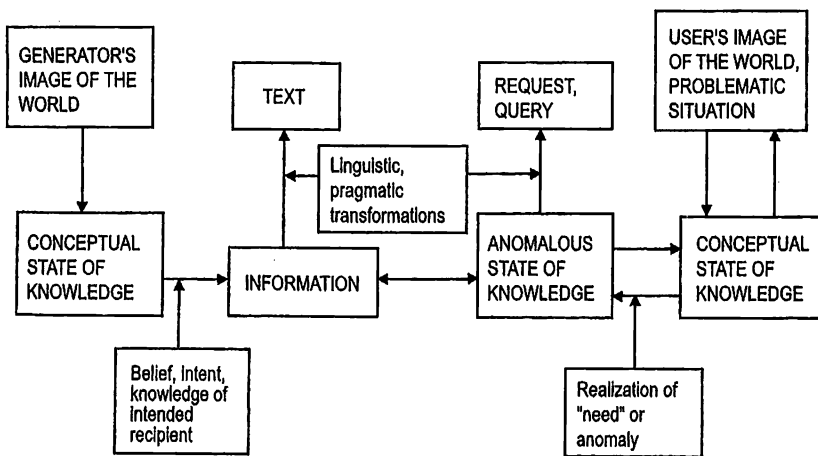


Figure 3.6

Belkin's ASK model. From Belkin (2005); reprinted with the permission of Information Today.

However, he claimed, most of the time people *don't know what they don't know* and cannot articulate their needs. Therefore, he recommended, we should view the seeking process at its very early inception, at ASK, and not assume that the process begins when people are able to spell out their information need or even when they are just able to determine its topic.

The ASK model bears similarities to other models, such as Taylor's (1968) model, which included the stages of the development of a need.¹¹ At the beginning of a need's formation, an individual feels a "vague sort of dissatisfaction ... [that is] inexpressible in linguistic terms" (182). Taylor named this the *visceral* stage. Later stages keep developing the need so that it can be presented to an information system. Clearly, the visceral stage and ASK represent the same state with different language and, as a result, slightly different meanings. Belkin's description of the concept *anomaly*—a state in which a person's knowledge is not adequate to resolve an information problem—is also very similar to Dervin's explanation of the "gap" that is created when a person's sense-making is not adequate to continue his journey through time and space. Here again, we have same situation—with different expressions and therefore varying meanings. Despite this similarity, sense-making methodology and ASK have developed in different directions. Basically, Dervin's model was set in context and was built to develop an overarching and rich methodology, while ASK was purely cognitive, independent of context, and was produced to support user-centered design of information systems.¹²

Another unique attribute of ASK is the level of analysis that it requires when applied in research. Belkin suggested that anomalies can be of different types that can be identified, both theoretically and in actual tests. No previous model had attempted to address cognitive processes to such a level of specificity. As a result of this approach, Belkin expanded the role of information systems: in addition to retrieving information, they should help users crystallize their need, much like the role the librarian fulfilled during reference interviews in Taylor's model. Belkin saw identifying the types of anomaly—and what information support they require—as a first step in designing systems that could fulfill this role.

Another model builder, Peter Ingwersen, is also a proponent of a cognitive view of information seeking that is closely associated with the design of information systems. Throughout the years, he has developed several models that he has continued to revise. His purely cognitive model, which represented the cognitive communication system for IR (Ingwersen 1999, 14), was similar to Belkin's approach in that both represented the actor as well as the system. Ingwersen, however, saw symmetry between the elements in the actor's and the system's contexts that made his model

unique. Ingwersen’s models were based on his view that during information retrieval an information system (whether human or machine) and a human actor are involved in an interaction that requires cognitive, and even emotional, processes in both participants. Therefore, a study of, say, users’ seeking behavior that is divorced from an understanding of the system’s retrieval behavior is incomplete. His *cognitive model in IR interaction* (Ingwersen 1996, 9), which is based on this same view, dealt most specifically with information seeking (figure 3.7). An expansion on the purely cognitive models, this model included elements such as the social and organizational environment and the work task or interest of the actor. The symmetry of actor and system is not as pronounced in this model; in fact, it is also incomplete since the system’s environment (e.g., level of technological developments, policies, and laws) is absent.

While symmetry is attractive because of its elegance, it is still difficult to understand how the cognitive and emotional states of the designer affect the design of an information system, particularly when the design process spans a period longer than a day (which is usually the case), during which time both states may go through several transformations. Even when used metaphorically, viewing each algorithm as

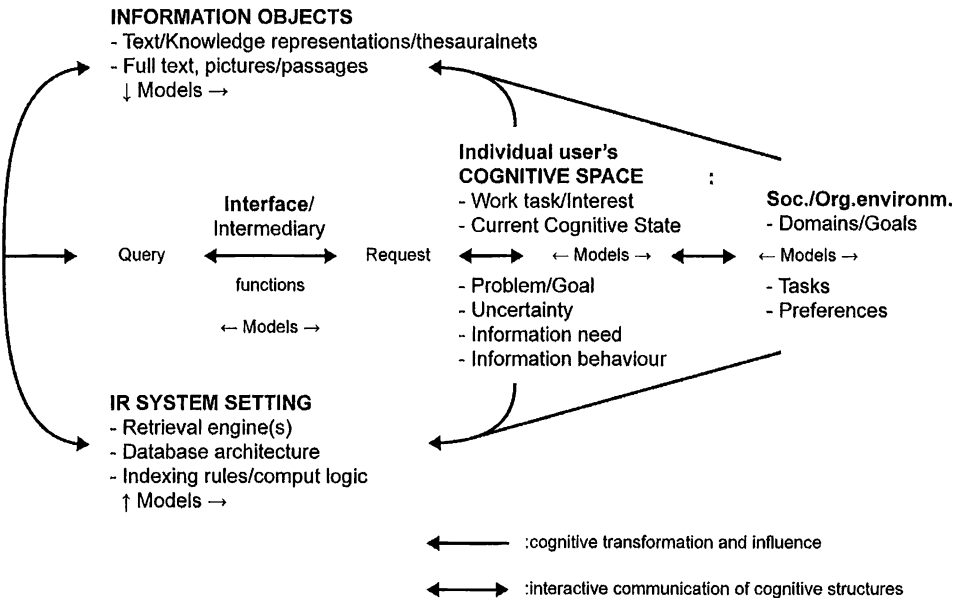


Figure 3.7

Ingwersen’s cognitive model in IR interaction. From Ingwersen (1996); reprinted with the permission of Emerald Group Publishing Limited.

a cognitive state, it is not clear how these states shape the interaction. Moreover, the actor's cognitive and emotional states occur before and during each interaction. In contrast, information systems are designed for *all* interactions and their design is supposed to be stable for a period of time. To keep the symmetry, the system would have to choose an algorithm for each stage in a query. This capability has not come to be yet and is possibly a goal that is undesirable and cannot be achieved. Nevertheless, this theoretical view is appealing and may lead to new insights.

It is not surprising that both Belkin and Ingwersen have focused on the cognitive aspects of information seeking. Both developed their models for the IR community, which is composed primarily of computer scientists who aim to develop general-context systems.¹³ In addition, the few IR researchers who have investigated information seeking have conducted laboratory experiments with computer-based information systems, which supported the design of general-context systems. Since cognitive aspects are considered common to all human beings, considering them may support the design of general-context systems. Moreover, because the cognitive state is considered to be independent of the context,¹⁴ laboratory experiments are valid tools to study information behavior from the cognitive perspective. IR researchers have just begun to integrate cognitive aspects in their experiments. At this point, it is not clear to what degree such aspects can guide systems design. It is too early, therefore, to consider the integration of other factors, such as social and contextual ones, into the design of computer-based, general-context systems—those that are designed to successfully respond to queries submitted by any actor in any situation.

Choosing a different path from Belkin's and Ingwersen's general and cognitive approaches, Leckie, Pettigrew, and Sylvain (1996) chose to investigate information seeking on the job. Based on a literature review of professionals' seeking behavior in three fields (engineering, healthcare, and law), they created a basic model, much less detailed than the previous ones, of the elements that shape seeking behavior (figure 3.8). The model contributed two new elements: work roles and awareness of information. They explained that a task could not be considered without examining the role of the actor, whether, say, managerial, technical, or interpersonal. The task of writing a memo, for instance, will generate unique information needs for members of each of the three groups. This combination of the task and the role would generate the information need that had to be met to continue the work. The seeking process was shaped by three dynamically interlinked elements: sources of information, awareness of information (knowledge of the information sources and the search process), and the outcome of the seeking process. Leckie and Pettigrew (1997) explained that they intentionally selected simple and relatively abstract elements. They claimed that many

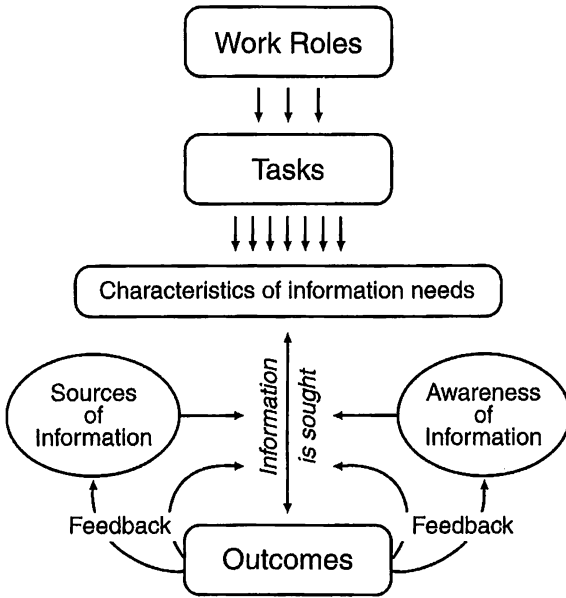


Figure 3.8 Leckie, Pettigrew, and Sylvain’s model of the information seeking of professionals. From Leckie, Pettigrew, and Sylvain (1996); reprinted with the permission of University of Chicago Press.

of the specific elements that represented professionals’ information-seeking behavior depended on local contexts, which made them improper for a general model. They replaced these specifics with broad, abstract elements for a general representation.

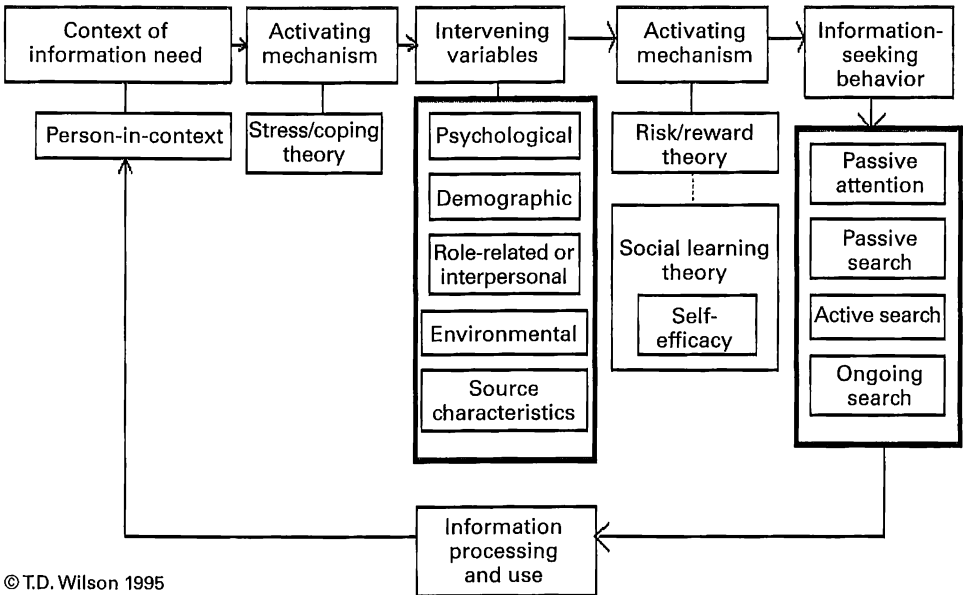
Element models can offer unique contributions both to research and design in information science. For research in the positivist tradition, these models propose variables and their possible associations ready for testing. They may also offer interpretive researchers some elements they may want to consider in their investigations. Creative designers of information systems and services can benefit by recognizing the constraints that limit and enable actors, as is argued in chapter 9.

3.3.3 Mixed Models

Several of the models representing information behavior are mixed ones, whether deliberately or inadvertently. The most integrative models represent activities in the seeking process and link these activities to the elements that shape each one of them. Two influential models show the nature of such models: one constructed by Tom Wilson (1997) and the other by Katriina Byström and Kalervo Järvelin (1995). A

different type of mixed model, created by Reijo Savolainen (1995), could be called an embedded model, in which the activities are nested in several levels of elements that shape them.

Tom Wilson, who is one of the founders of the field of HIB and a most prolific writer, has developed an ever-evolving set of models.¹⁵ The first were element models (e.g., Wilson 1981) based on his empirical research at a U.K. local-authority social services department (Wilson and Streatfield 1977; Streatfield and Wilson 1982). After additional empirical studies and further developments in the field, Wilson (1997) amalgamated his previous models and fused them with components of theories in fields such as psychology and education to build a new and revised model. In this model, as shown in figure 3.9, the first four columns represent elements (variables or theories) that all lead to information seeking, which is represented in the fifth column in one black box. The columns represent consecutive progression and thus, implicitly, stages in seeking. The first "Activating mechanism" box represents the decision to take action to satisfy an information need, and the second such box represents the decision to search information sources.



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Figure 3.9

Wilson's general model of information-seeking behavior. Source: <http://informationr.net/tdw/publ/papers/1999JDoc.html>. Reprinted with the permission of Tom Wilson.

Wilson (2005) offered the model as a general framework for research in ISB. On the one hand, he shows that it is general enough to represent various HII situations, such as encountering information, which was represented by including boxes for passive attention and passive search. On the other, he claims, it can contribute to all research in ISB by drawing “the attention of the researcher to the totality of information behavior and showing how a specific piece of research may contribute to an understanding of the whole” (Wilson 2005, 35).

Byström and Järvelin (1995) picked up where Wilson’s model closed; they opened the black box of information seeking in the context of the workplace. Their model, which was less ambitious than Wilson’s, was constructed to guide their research project about the effects of task complexity on information behavior and use (figure 3.10). They derived the model from previous research and from models in HIB to

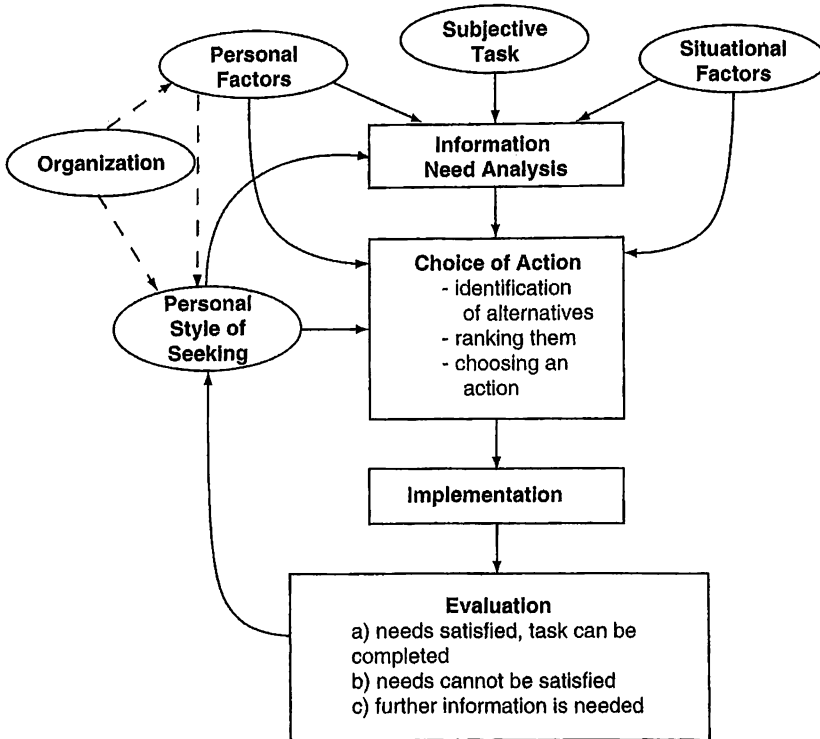


Figure 3.10

Byström and Järvelin’s model of information seeking. From Byström and Järvelin (1995); reprinted with the permission of Elsevier. © 1995 Elsevier.

embody a process-in-context in which the task was a central element. Their model represented information seeking on two planes, each designated with its own graphical form— ellipsoids and boxes—one for the elements and the other for the activities carried out during a seeking process. An arrow from a box (designating an activity) led to the next stage in the process, and an arrow from an ellipsoid (designating an element) led to the stages it shaped. These explicit, many-to-many relationships between elements and activities are very rare in HIB models, which have usually represented the seeking process on a higher level of abstraction. However, the Byström and Järvelin model was built to lay out the assumed relationships that had guided their study. Its central goal was to serve as a source for formulating research questions and generating hypotheses—rather than to serve as a model to guide studies in general.

Whereas the Byström and Järvelin model represented information seeking in the work environment, Savolainen (1995) represented another facet of life in his model of *everyday-life information-seeking* (ELIS). The model was based on previous work in HIB and informed by “the theory of *habitus* developed by Pierre Bourdieu” (Savolainen 1995, 261). It provided a graphic representation of the process, with boxes nested in boxes, where elements in a box shaped those in the box nested in it, with some reciprocal relationships in the central box (figure 3.11). Factors that shape everyday life were laid out in the long box on the right-hand side of the center box. In the center were the elements in everyday life, all nesting the process of information seeking (in the bottom left-hand box). To fully understand the model requires reading the article that describes it because Savolainen created new concepts to represent daily life and people’s approaches to it.

One of the contributions of the model is the representation of reciprocal and dynamic relations between activities and the elements that shape them. For instance, “problem-solving behavior” and “problematic situations of everyday life” shape one another. Clearly, a specific problematic situation would shape the way an actor solved the problem. At the same time, however, the process of solving the problem would create a new problematic situation, the shape of which would be influenced by the way the actor had solved the previous problem. The model is still continuing to evolve as Savolainen and other researchers have been testing it and discussing refinements.

3.3.4 Models: Conclusion

Most of the models presented here were heavily and productively used by other researchers for empirical as well as conceptual investigations. Yet their variety raises a question: Why is there a need for so many models? After all, they all represent the

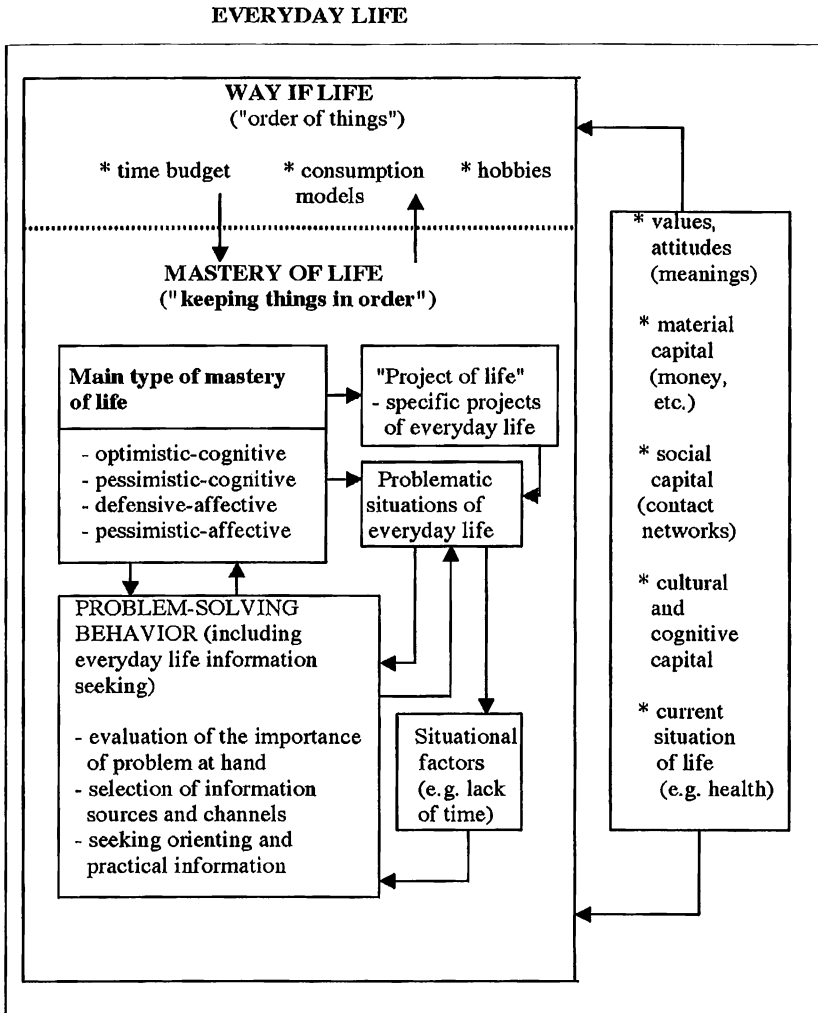


Figure 3.11 Savolainen's model of everyday-life information-seeking. From Savolainen (1995); reprinted with the permission of Elsevier. © 1995 Elsevier.

same reality (whether real or perceived): Why not aspire to create one grand model that includes them all? Some scholars believe that there is a need for such a model (e.g., Hepworth 2004; Kuhlthau 2005). Tom Wilson (1994), for example, argued:

[T]here is a need for an integrative model of information need, information-seeking behaviour and information use. That integrative model is already almost complete: it is a person-centered model, based largely on Dervin's 'sense-making' approach, but with extensions (actual and potential) into models of information-seeking behaviour, the multi-contextual character of information needs and the nature of user satisfaction. (42)

Wilson (1999) made a first step in this direction and tried to integrate three models without success (as described earlier). His failure was not a result of poor execution, but stemmed from the inherent impossibility of such an endeavor. It is also not clear whether the creation of a global, unified model is desirable.

Several reasons make the creation of a grand model almost impossible. The models are of different types (action, element, and mixed models) and on a different level of abstraction, and the number of elements and the level of specificity of the activity descriptions is very high, all of which result in a great number of components to integrate into one model. Furthermore, each new model introduces new elements, activities, and relations. If all were to be included in one model, the resultant construct would become unmanageable and probably almost impossible to understand. This barrier can be removed, however, if the grand model is much more abstract than the current models. This way, specific elements and activities would be subsumed under broader categories that might render the model manageable and coherent. The risk in building such a model is the possibility that its generality would make it useless—in other words, that the activities, elements, and their relations so broadly described could be ascertained with common sense alone.

More important than constructing one grand model is the nature of these individual models: Each one represents reality from its creator's point of view and her perception of it. Moreover, no "agreement" among creators can be expected, nor a complete overlap among models in the concepts they represent. Is it possible, then, to create an "objective" model? If yes, who would be qualified to build it? If no, whose view should guide the creation of the one grand model? It is highly unlikely that responses to these questions can be found. To overcome some of these difficulties, one may suggest that there might be several grand models, each with a different point of view. While theoretically possible, such an approach seems impractical for models of ISB since the creators' points of view are highly diverse as well and no dominant perspectives can be identified. This diversity emphasizes a creator's responsibility to explicitly explain what theories, ideas, and theoretical traditions have shaped

his model, as such explanations increase the depth of readers' understanding of the model.

The lack of a grand model is not a loss to the field. In fact, I believe such a model is undesirable. While HIB models represent the same reality, their variety represents the diversity of research approaches in the area. A diverse research community has many advantages. For example, different approaches bring to light different aspects of the same object of study and new concepts. While this variety is a barrier to integration, it is a source of stimulation and cross-fertilization. Avoiding one dominant approach offers a space for researchers whose point of view differs from the dominant approach and creates the conditions for new developments. In addition, with so many models, it is likely that almost every researcher can identify an existing model that would support and guide her work.

3.4 Conceptual Constructs: Conclusions

The rate of growth of ISB conceptual constructs has accelerated in time. While at its inception the field saw one new construct every two or three years, quite a few of them have been sprouting each year in recent times.¹⁶ This vigorous activity in building conceptual constructs can be partially explained by the lack of some generally accepted ones that can support research work. Some may explain the flood of constructs by claiming that ISB is a young field and as such is still in the process of building its conceptual foundations. In that case, it is not clear whether ISB research is on a constructive path for foundation building. While some constructs may accidentally complement one another, there have been no efforts to follow a cumulative process. A few constructs have been influential—such as those created by Taylor (1968), Dervin (1992), and Chatman (2000)—and have contributed to the development of other ISB constructs, but almost all of the many others were constructed with no reference to their equals and are completely independent of one another.

Having variety in conceptual constructs is necessary for a field to be open-minded and accepting of a diversity of viewpoints. But this variety is more likely to be productive with some self-control, whereas ISB constructs are out of control, pushing in many different directions. Most have been applied only by their creators, even though each one provides its own contribution. One hopes that future developments might lead to some convergence, resulting in a smaller number of constructs, each with implications that can nourish a variety of research strands. These could provide a solid conceptual foundation to ISB.