Information Use as Gap-Bridging: The Viewpoint of Sense-Making Methodology

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The conceptual issues of information use are discussed by reviewing the major ideas of sense-making methodology developed by Brenda Dervin. Sense-making methodology approaches the phenomena of information use by drawing on the metaphor of gap-bridging. The nature of this metaphor is explored by utilizing the ideas of metaphor analysis suggested by Lakoff and Johnson. First, the source domain of the metaphor is characterized by utilizing the graphical illustrations of sense-making metaphors. Second, the target domain of the metaphor is analyzed by scrutinizing Dervin’s key writings on information seeking and use. The metaphor of gap-bridging does not suggest a substantive conception of information use; the metaphor gives methodological and heuristic guidance to posit contextual questions as to how people interpret information to make sense of it. Specifically, these questions focus on the ways in which cognitive, affective, and other elements useful for the sense-making process are constructed and shaped to bridge the gap. Ultimately, the key question of information use studies is how people design information in context.

Introduction

The issues of information use pose a major challenge for library and information studies, both conceptually and empirically. For example, surveys focusing on questions such as how often people visit job-related Web pages or consult a reference librarian may yield useful results for the development of information services. However, these surveys rarely address theoretically demanding questions such as what kind of processes take place when people make use of information received from different sources and channels. Usually, because of conceptual and methodological difficulties, the processes of information use are left within a “black box”; major attention is paid to concrete issues such as the frequency of library use within a certain period of time.

In the present article, an attempt is made to open the “black box” of information use by drawing on the ideas of sense-making methodology (sense-making). Since 1972, Brenda Dervin has developed this approach and over the years, the methodology has been expanded and transformed significantly. From these beginnings, sense-making has evolved into a generalized communication-based methodology seen as useful for the study of human sense-making (and sense-unmaking) in any context. Since the 1980s, sense-making has significantly influenced the methodological viewpoints of information needs and seeking studies (Dervin & Nilan, 1986). Importantly, sense-making has also provided new ideas about information use but so far, they have not been discussed in detail. The present study focuses on the issues of information use by exploring the potential provided by sense-making. The main emphasis is on the conceptual and methodological questions of information use. However, the findings also give guidance for the empirical study of information use processes.

The Influence of Sense-Making on Information Use Studies

In library and information studies, the issues of information use are primarily explored in the context of information needs and seeking. However, the number of studies explicitly focusing on information use has remained fairly low compared to studies on information needs and seeking (see, for example, Pettigrew, Fidel, & Bruce, 2001). In particular, there is a dearth of theoretical and methodological approaches to information use, even though some studies discussing these topics may be mentioned. In the beginning of the 1990s, Taylor (1991) introduced the widely cited concept of information use environments. Cole (1997) and Todd (1999) approached information use from the cognitive viewpoint by focusing on the ways in which information received by the individual changes his or her knowledge structures. Tuominen and Savolainen (1997) proposed a social constructionist approach to information use by conceptualizing it as the construction of versions produced in dialogue.
Savolainen (2000) compared the ways in which information use has been conceptualized in Brookes' (1980) fundamental equation and Dervin's sense-making theory.

In information use studies, sense-making has been influential since the 1980s. The call for a user-centered approach suggested by Dervin and Nilan (1986)—significantly drawing on the ideas of sense-making—has been widely accepted in studies on information needs, seeking, and use. For example, Taylor (1991) draws heavily on the empirical findings of information use provided by Dervin (1983); on the other hand, he does not reflect the concept of information use as defined in sense-making. Pettigrew, Durrance, and Unruh (2002, pp. 900–901) provide a more recent example. Interestingly, they draw on the categories of sense-making and partly redefine them in a study focusing on the use of online community networks. The extrapolation of sense-making categories helps to map the empirical findings of their study in that the mapping specifies various kinds of situations that create needs for information (or gaps), barriers that the users encounter when expressing those needs and while seeking information and the results, or “helps” that the user obtained through the course of information seeking. However, the concept of information use (as gap-bridging) is not reflected in more detail in the above study.

**Research Task**

The above examples indicate that there is a genuine need to assess more specifically the potential and possible limitations of sense-making as a major user-centered approach to information use. In addition—closely related to the aforementioned issues—there is a need to analyze in greater depth the metaphors on which the assumptions of information use have been built in sense-making. As specified later, the phenomena of information use are approached in sense-making as processes of gap-bridging. The metaphor of gap-bridging is an integral part of the metaphorical triangle of situation–gap–uses in that gap-bridging stands for the process which results in various outcomes of information seeking and use.

The present study asks what kind of methodological guidance sense-making gives to study the phenomena of information use. What is the nature of the metaphor of gap-bridging and in what ways does this metaphor make the phenomena of information use more understandable? To explore these questions, the ideas of metaphor analysis as suggested by Lakoff and Johnson (1980) are utilized in the present study (see also Lakoff, 1987, 1993). Because of the metatheoretical nature of these questions, the present study focuses on conceptual issues of information use. Substantive findings on information use received from empirical sense-making studies will not be reviewed in this article.

Dervin is unquestionably the key theorist of sense-making; therefore, it is natural to focus on her writings. The primary articles where she discusses information use are Dervin (1983, 1992, 1999b, 2003) and Dervin and Frenette (2003). In the selection of sense-making texts, the fact that Dervin’s conceptions of information use have changed to some extent since the early 1980s was acknowledged. Thus, the texts also provided opportunities for comparative examination.

**Basic Assumptions of Sense-Making**

Even though there have been some shifts in emphasis, sense-making has always been concerned primarily with theorizing of the metatheoretical sort. As Dervin (1999b, p. 729) points out, the sense-making mandate has been focused primarily on the development of philosophical guidance for method, including methods of substantive theorizing and of conducting research. In general, sense-making may be characterized as a theoretic net, a set of assumptions and propositions, and a set of methods that have been developed to study the making of sense that people do in their everyday experiences (Dervin, 1992, pp. 61–62).

In the 1970s and 1980s sense-making was first developed as an approach to studying information needs, seeking, and use communicatively. At that time, sense-making was defined as communicative behavior. Information seeking, processing, creating, and using were seen as central activities of sense-making (Dervin, 1983, p. 3). According to Dervin, sense-making can be seen as behavior, both internal (cognitive) and external (procedural), which allows the individual to construct and design his or her movement through the time–space context. This suggests that the early sense-making research conducted in the 1980s was informed by assumptions received from cognitive and constructivist approaches. In the 1990s, the metatheoretical assumptions of sense-making incorporated ideas of communitarism (Dervin, 1994).

Recently, the ideas of “verbing” practices have been emphasized as a distinctive feature of sense-making (Dervin, 1999b; Dervin & Frenette, 2003).

The importance of this category is emphasized to the extent that sense-making is characterized as “verbing analytic” (Dervin & Frenette, 2003, p. 237). The verbing is primarily posited as an ontological category. In general, verbing can be understood as the “designing of cognitive and emotional elements that serve sense-making and sense-unnaking.” As Dervin and Frenette (2003, p. 239) point out, sense-making is accomplished by “verbs that involve the making or using of ideas or both, cognitions, thoughts, and conclusions; attitudes, beliefs, and values; feelings, emotions, and intuitions; and memories, stories, and narratives.” By focusing on verbs such as “factizing” (that is, making facts), defining, and hunching, sense-making aims at freeing research from the implicit assumption that there is one right way to produce knowledge or to use information. This suggests that from the beginning, the phenomena of information use should be approached from the viewpoint of constructing, as designing and shaping of cognitive and affective elements of various kinds (Dervin, 1999b; cf. Dervin, 1993).

Recent characterizations of sense-making also emphasize the importance of energy and forces that impel, assist, and facilitate movement, as well as constrain, hinder, and limit it.
Every moment of sense-making is seen to involve energy, more specifically, force, power, and constraint. Energies may come within (for example, motivation and resistance) and without (for example, help from other people, barriers), and from unique circumstances and enduring social conditions. This suggests that in different situations, humans seeking and using information are impacted by constraining forces of structural power; on the other hand, individuals may be seen as sites of power to challenge and resist the constraints and to find alternative ways to continue movement.

**Reconceptualizing Information**

As the above examples of verbing indicate, sense-making takes a critical stance towards the usual meaning of the concept of information. This viewpoint also has important consequences for the conception of information use. In particular, Dervin takes a critical stand on information that is conceived of as something static, ordered, isomorphic, entity-like, and external, and which is imposed on individuals as one outcome. The concept of information perceived this way is seen to be problematic because it “freezes time-space and person and restricts information to that produced and used by one narrow set of sense-making strategies” (Dervin, 1999b, p. 740). Thus, “fundamentally, sense-making mandates the disappearance of the term information as a static absolute ontological category” (p. 740).

The above ideas suggest that it may be more productive to conceptualize human beings not as seekers and users of information but rather as information “designers” (Dervin, 1999a). Thinking of the nature of the gap-bridging process, the reference to design is important, because information should be conceived of as something malleable, designable, and flexible, like clay to be molded according to situational needs (cf. Dervin & Nilan, 1986). Thus, there is no final information describing an ordered reality; information is no longer seen as a static or entity-like phenomenon or an inhabitant of the rational–cognitive realm, but rather a human tool designed by human beings (Dervin, 1999a). Because the term information tends to be qualified as a structural term, Dervin (1999b, p. 738) recommends that it should be specified with a phrase like “information as defined by the expert.” However, if information is conceived of as a verb, that is, looking at the ways in which people “informationally” design and shape their worlds, information may be referred to by expressions such as factizing, emoting, comparing, creating, socializing, and resisting (Dervin, 1999a).

Another novelty in the approach to information is that no distinction is made between knowledge and information (Dervin, 1998). This is because of the pragmatic viewpoint adopted by Dervin: Knowledge versus information are system distinctions of no meaning to lived experience and movement through time-space. Thus, it is of secondary importance whether the input to sense-making is defined as information or knowledge. Information–knowledge is seen “as product of and fodder for sense-making and sense-unmaking” (Dervin, 1998). In other words, both information and knowledge can serve either as an input (“fodder”) and output (“product”) of sense-making. Sense-making demands attention not only to the material embodiment of knowing but also to the emotional and feeling framings of knowing. In this respect, Dervin’s approach has similarities with Kuhlthau’s (1993) information search-process model incorporating three realms: the affective (feelings), the cognitive (thoughts), and the physical (actions). As Dervin (1998) suggests, sense-making should devote attention to “the entire human package (body, mind, heart, soul),” which is simultaneously verbed, constantly evolving, and becoming, and intricately intertwined. A holistic picture is drawn and there are no false dichotomies between cognitive versus affective elements constituting the fodder/product. Hence, the issues of information use are not limited to the cognitive realm of experience.

If the concept of information occupies a secondary position in the vocabulary of sense-making, we may wonder whether it is meaningful to explore the issues of information use from the viewpoint of this methodology. What if the worlds of sense-making and other approaches to information use, e.g., the cognitive viewpoint, do not meet at all? Are we sending questions to the wrong address if we ask how information use is conceptualized in sense-making because this methodology seems to question the meaningfulness of the concept of information, and hence, information use?

Undeniably, there are fundamental differences in vocabularies but still there seem to be areas of common interest. The common interests of sense-making and other approaches to information use can be grounded by looking at the recent developments in information seeking and use studies. It seems that the differences between sense-making and other approaches have become smaller compared to the 1980s, when Dervin and Nilan (1986) published their influential call for a new paradigm, offering an alternative to the system-centered ways of information seeking and use. The growing popularity of user-based approaches and growing criticism towards the limitations of the system-centered views and the information transfer model have changed the ways in which information or informational phenomena are seen in information studies (Tuominen, Talja, & Savolainen, 2002).

We may argue that within the user-based approaches, information is no longer seen as a static or entity-like phenomenon or an inhabitant of the rational–cognitive realm, but rather as a personal and situation-bound construct, which combines cognitive and affective elements. Apparently, information as perceived in user-based studies at large has more and more in common with the host of factors affecting sense-making. Even though information as defined by the user-based approaches and Dervin’s input/fodder may not be identical, they seem to overlap sufficiently. Thus, we may continue our study assuming that sense-making has something important to say about information use more generally and that the ideas developed from the specific viewpoint of sense-making are relevant to studies of information use at large.
The Nature of Sense-Making Metaphors

Dervin illuminates the processes of sense-making by drawing on the metaphor of journey. This metaphor is popular in everyday language (Lakoff & Johnson, 1980). The sense-making metaphor conceives of the subject as an individual mandated to wander in a time–space context. All human behavior takes place in this context: Time–space relationships are present both in physical (bodily) and cognitive behavior. The sense-maker relates himself or herself both bodily and cognitively to varying contextual (time–space bound) demands emerging from the encounters with the everyday world as the journey proceeds.

Metaphorically, sense-making can be seen as continuous step-taking in the everyday world which is characterized by ultimate discontinuity. Every step means an act of defining the situation emerging due to the continuous moving ahead. Thus, every sense-making instance is seen as arising from a past in the present and moving toward a future. This suggests that the sense-maker is assumed to be simultaneously situated and transsituated (Dervin, 1999b, p. 733). In many cases, the step-taking is repetitive in nature, and the sense-maker can draw on definitions that worked sufficiently well in similar situations faced earlier. This implies that the journey is not necessarily linear; occasionally, the step-taker may turn back in order to draw on previously achieved understandings.

What then is the specific nature of the metaphors of step-taking and gap-bridging? According to Lakoff (1987, pp. 276–278), the main idea of a metaphor is that by means of an expression taken from a concrete area (source domain), something located in the target domain may be made more understandable. The target domain is abstract, unknown, and difficult to envisage, as far its meaning is concerned. The metaphor can be made understandable as a mapping from a source domain to a target domain (Lakoff, 1993, pp. 206–207).

The mapping is structural and captures the ontological correspondencies in that the entities in a domain source correspond systematically to the entities in the target domain. For example, in the metaphorical expression “Love is a journey,” the mapping is a set of ontological “correspondencies” that characterize epistemic correspondencies by mapping knowledge about journeys onto knowledge about love. By means of these correspondencies, we may reason about love using the knowledge we use to reason about journeys: for example, the lovers correspond to travelers. In itself, each mapping defines an open-ended class of potential correspondencies across inference patterns (Lakoff, 1993, pp. 210).

One of the strengths of metaphors is that they create a stereoscopic vision that allows simultaneous viewing of an idea from two or more points of view. On the other hand, similar to allegories, metaphors may yield an oversimplified picture of reality and may at least partly mislead our thinking. Most metaphorical concepts provide incomplete tools for describing things, because metaphorical structuring is partial (Lakoff & Johnson, 1980, p. 12). That argument may also be applied to the metaphors of step-taking and gap-bridging. On the other hand, the assumption of partial structuring is in accordance with the idea emphasized by Dervin (1999b) that ontology and epistemology are always incomplete. If metaphors could describe things to the last detail, there would be no need to represent something as something else.

This being the case, how much can metaphors tell about reality? Are they “just metaphors,” nothing more? In the present study, it is assumed that metaphors do not mean innocent playing with words or pure speculation. On the contrary, despite an awareness of the limitations of metaphors, they should be taken seriously in that they suggest what the world is like and how it should be approached. Apparently, the metaphors of step-taking and gap-bridging make no exceptions here: Both have theoretical and methodological implications. In the words of Richard Boyd (1993), we may argue that they are theory-constitutive metaphors, which invite us to uncover similarities and analogies. In this way, metaphors function as heuristic devices by which we may develop hypotheses concerning the phenomena that they refer to. By explicating the metaphor of gap-bridging we may also gain new insights into the phenomena of information use in a substantive sense.

Naturally, we have to ask what the methodological limitations of the metaphors of step-taking and gap-bridging in the description of cognitive activities are. These metaphors seem to suggest that, for example, thinking and information seeking can be approached as if they were physical actions such as walking on the road. What would it mean to conceive of human communication as step-taking? Would there be a danger of oversimplifying complicated processes? Most metaphors tend to highlight certain dimensions of action and ignore others. This is also obvious in the case of step-taking and gap-bridging metaphors. To tackle these problems, there is a need to shed more light on the nature of metaphors.

Metaphors can be classified by a number of criteria. In the context of step-taking, orientation and spatial metaphors are of particular interest because step-taking is contextualized in time–space and moving ahead is central to these metaphors. The spatial metaphors arise from the fact that we have bodies of the sort we have and that they function as they do in our physical environment (Lakoff & Johnson, 1980, p. 14; pp. 25–27). Orientation and spatial metaphors are not arbitrary because they have a basis in our physical and cultural experience. For example, the future is perceived as if it were in front of us, in contrast to the past which is conceived of as being behind us.

Lakoff and Johnson suggest that our experiences with physical objects, especially our bodies, provide the basis for an extraordinarily wide variety of ontological metaphors, that is, ways of viewing events, activities, emotions, and ideas as entities and substances. The structure of our spatial concepts emerges from our constant spatial experience, that is, our interaction with the physical environment. Concepts that emerge in this way are concepts that we live by in the most fundamental way. Interestingly, bodily experiences are
given a constitutive status in the description of the sense-maker taking steps and bridging gaps. However, many aspects of our experience cannot be clearly delineated in terms of the naturally emerging dimensions of our experience (Lakoff & Johnson, 1980, p. 177). This is typically the case for human emotions, abstract concepts, mental activity, time, work, human institutions, and social practices.

This means that, for example, in the case of information use, the formal (or literal) mapping between the source and target approach may lead to problems because a relation between objects in the source domain does not necessarily hold in the target domain (Madsen, 1994, pp. 58, 61). Thus, there is a need to adopt a pragmatic approach by acknowledging that metaphors inevitably involve incompleteness and mismatches. The pragmatic approach emphasizes the employment of metaphor as a kind of seeing something as something else, drawing on previous situations and concrete examples rather than abstract rules and fixed categories. On this basis, metaphors can be conceived of as useful heuristic devices by which one may develop conceptions and hypotheses concerning the phenomena to which they refer. In the following, the sense-making metaphors are explored from such a pragmatic viewpoint.

Approaching Information Use as Gap-Bridging

In general, the issues of information use can be approached from two major viewpoints: (a) information use as a process, and (b) the various outcomes of this process. The present study focuses on the former viewpoint. However, we may briefly characterize the outcomes of these processes because they make the processes of information use more understandable. In sense-making, the outcomes of information use are referred to as helps or hurts (uses). Empirical examples of uses include “got pictures, ideas, understandings; kept going; got out of a bad situation; got pleasure, and confirmation and got connected to others” (Dervin, 1983, p. 17; cf. Dervin & Frenette, 2003, pp. 242–243). In abstract terms, outcomes of information use may also refer to functions and dysfunctions, as well as consequences, impacts, or effects (Dervin & Frenette, 2003, p. 238). Overall, the above list describes the ways in which people put answers to use (cf. Dervin, 1992, p. 75).

As noted above, the sense-making metaphors serve as heuristic constructs suggesting the ways in which human sense-making and information use may be approached. Hence, the metaphor of gap-bridging is not intended as a literal description of information use (Dervin, 1999b, p. 740). Rather, it is intended as a highly abstract methodological tool, a way of looking. Departing from these assumptions, we may clarify the metaphorical setting by speculating how the gap-bridging takes place as a process. The analysis continues by studying how the conceptions about gap-bridging are mapped onto conceptions about information use in sense-making methodology. In the characterization of the source domain of the metaphor, we primarily draw on the interpretation of the graphical illustrations of sense-making methodology because they are intended to concretize the heuristic metaphors of step-taking and gap-bridging. The intriguing question is, what kind of methodological insights does the concept of gap-bridging suggest to the study of information use? If information use is the abstract phenomenon that is difficult to conceive, how does the conceptions of gap-bridging presented in source domain help to understand the issues of information use in target domain?

Given the fundamental assumptions of sense-making we may think that in some cases the step-taker not only constructs bridges but sometimes also deconstructs them (along the same lines as gaps are made and unmade, perhaps bridges are also made and at least partly unmade during step-taking). However, we focus on the construction of bridges, not their deconstruction.

Gap-Bridging: Characterizing the Source Domain

Sense-making conceptualizes various situation movement states that indicate the ways in which the step-taker sees the self as stopped or moving at a particular moment in time (Dervin, 1983; Dervin & Frenette, 2003, pp. 242–243). A central ontological and epistemological assumption of sense-making concerns the discontinuous nature of reality that is always potentially subject to multiple interpretations due to changes in reality across space, changes across time, and differences in how humans construct interpretive bridges over a gappy reality (Dervin 1999b, p. 730). The gap is subjective in nature and it can be seen as an attribute of a specific time–space moment where the individual has to reevaluate his or her ways to continue step-taking. The gap stands for the questions or clarifications asked in situations such as these. Answering the questions can be conceived as a constructing activity by which the individual tries to build a bridge across the gap. Figure 1 illuminates a gappy situation.

Due to space constraints, gap-bridging is illustrated here by referring to only one type of situation movement state, namely a “wash-out” situation where the road suddenly disappears. In the wash-out situation, the individual has to stop to find a new beginning. In concrete terms of the source domain, we may think that the road has been washed out by a flood. First, we may speculate that the step-taker, stopped on the brink of the gap, will define its major qualities. We may think that typical cases, the attempts to bridge a gap are preceded by gap-facing and gap-defining, followed by the consideration of gap-bridging strategies and tactics. Obviously, these processes are so intertwined that they are separable only analytically. Having faced the gap, the step-taker begins to evaluate the nature of the barrier. The individual stopped at the gap evaluates the scene: He or she may have some assumptions of anticipating outcomes of gap-bridging (various kinds of helps, possible hindrances, etc.). These judgments are probably based on earlier experiences of how different kind of means and tools enabled the construction of
bridges and how the bridges being built helped to continue the journey.

In any case, the ways in which the individual encounters the gap is important here: How small or large is the gap from the viewpoint of the step-taker and how does he or she conceive of the possible helps? The anticipation horizon offers motivation to take the next step, or in more general terms to start the project of planning the gap-bridging and finally, bridging it “in practice.” Thus, we may make an analytical distinction between (a) planning the gap-bridging based on earlier experiences and anticipatory assumptions associated with them, and (b) bridging the gap. Naturally, these phases may overlap because the acts of planning and “realizing” may form a combination which can be divided into parts only analytically.

The construction of the bridge is illustrated in Figure 2.

As Figure 2 suggests, the construction of the “informational” bridge consists of identifying, finding, and combining various elements such as ideas, beliefs, and narratives. We may think that particularly in the case of a large gap, the construction of the bridge may occur in several phases; as the bridge builder combines and shapes various elements, he or she may simultaneously step on the bridge partly built towards the opposite end of the gap. When a sufficient number of elements have been found and combined, a good enough bridge had been erected enabling the crossing of the gap.

Information Use: What Kind of Gap-Bridging?

Figure 2 above serves the needs of illustration; it is necessarily simplified and may suggest that gap-bridging is always purposive and goal-oriented. However, as discussed below, gap-bridging may occur in myriad ways and it may be entirely capricious. Despite this reservation, Figure 2 is specific enough to elucidate the nature of the source domain of sense-making metaphors. We continue the analysis by examining how the conceptions of gap-bridging suggested by Figure 2 may be help to clarify the nature of information use from the viewpoint of sense-making.

In general, the gap-bridging metaphor illustrated in Figure 2 suggests that information use is a highly contextual activity. Information use depends on what kind of a gap has been encountered, and when and where it takes place. In addition, the metaphor implies questions of how the gap could be bridged (for example, by drawing on ideas or cognitions). Figures 1 and 2 also suggest that gap-facing and gap-bridging deal with broader questions than merely seeking and using information defined as a factual description of ordered reality. It is assumed that the bridges that are built to cross gappy reality might incorporate cognitive as well as emotional elements. The above interpretation suggests that the metaphor of gap-bridging makes the phenomenon of information use understandable by providing a framework that prompts specific questions concerning the context of
information use. Importantly, the metaphor also suggests questions concerning the nature of the bridge, for example, what kind of cognitive and affective elements can be involved in the processes of information use.

As to the study of the specific nature of information use processes, the formulations of sense-making studies so far have remained quite general. Interestingly, these characterizations differ in early and more recent sense-making research. In terms of early sense-making studies, information seeking and use were posited as “constructing” activities (Dervin, 1983, p. 5). The term constructing refers to “what is involved in information sharing interactions no matter what the context.” Information sharing was conceived of as “the successive modifications of internal pictures of reality, a series of constructings and reconstructings.” In this context, Dervin did not specify whether the “internal pictures” merely deal with autocommunicative acts, that is, intrapsychic processes or whether the “information sharing” also implies dialogic (interpsychic) relationships. The formulations of early sense-making were fairly succinct: “...people first rely on their own cognitive resources. If these are not sufficient, they reach out first to sources closest to them or those contacted on their habit paths. When they find useful information, they judge it not on its expertise or credibility, but rather in terms how it helped them” (Dervin 1989, p. 80).

Some years later Dervin (1992, p. 65) characterized information use by noting that it “… must be conceptualized as behaviors: the step-takings that human beings undertake to construct sense of their worlds.” Specifically, the individual should be seen “as an entity behaving at a moment in time-space” (p. 66). Further, it is assumed that the individual “constructs ideas of these moments and these constructions are themselves strategies” (p. 66). It should be noted that the nature of these strategies and tactics is not discussed in greater detail in sense-making.

It is characteristic of these generally defined strategies and tactics that some of them “are sometimes repetitions of ideas used in the past and sometimes newly created because of how the individual defines the new situation... the individual will implement his or her pictures using behavioral tactics which are responsive to the individual’s ideas of the situation” (Dervin, 1992, p. 66). In a different moment facing a different gap he or she may use a different tactic. He or she may be very rigid, but the rigidity may be of the kind that says “given this gap, then this tactic. Or, he/ she may be very flexible, or perhaps entirely capricious” (p. 66). Therefore, even though there may be certain strategies or tactics that are preferred over others, the logic of constructing an individual bridge is hard to predict; much depends on situational cues. Specifically, these step-takings (or “communicatings”) were characterized as “both internal behaviors (e.g., comparings,
Nouns stand for relatively stable representations of reality, late that ultimately, designing of information is based on defined as a specific example of verbing. We may speculate and producing diverse versions of reality. In turn, the design of internal pictures,” however, can be made more understandable by referring to gap-bridging because “modification” can be understood as construction processes where cognitive and affective elements are assembled and shaped. Thus, the conception of gap-bridging can clarify the conception of “modification of internal pictures” because both conceptions are approached from the viewpoint of construction. As the step-taker illustrated in Figure 2 may assemble “planks” and “boards” and shape other materials available to construct a bridge, the internal pictures may be assumed to be the result of comparing, relating, shaping, and assembling of cognitive and affective elements.

However, the analysis of the connections between source domain and target domain conceptions is rendered difficult because in itself, “modification” (as a kind of shaping or constructing activity) is used in a metaphorical sense. When we try to make the source domain concept (gap-bridging) more understandable by referring to another metaphor (construction) that functions as a link to the target domain conception (modification), the setting easily becomes ambiguous. In itself, this is not surprising; the above interpretation reflects more generally the conceptual difficulties of getting a grasp of the phenomenon of information use.

In a recent characterization of sense-making, Dervin (1999b) approaches the phenomenon of information use more empathically from the viewpoint of verbing. Sense-making deals with “constructing bridges using different verbings for doing so, and arriving at outcomes and consequences” (p. 740). This characterization aptly crystallizes the major content depicted in Figure 2. In particular, sense-making directs attention to the verbings, that is, the ways in which people make or use “cognitions, thoughts and conclusions; attitudes, beliefs and values; feelings, emotions and intuitions; and memories, stories and narratives” (Dervin & Frenette, 2003, p. 239). Thus, verbing is posited as a general level category that refers to the practice of “making” of ideas and producing diverse versions of reality. In turn, the designing of information (or fodder for sense-making) may be defined as a specific example of verbing. We may speculate that ultimately, designing of information is based on the dialectical dance between nouns and verbs or between “rigidities” and “fluidities” (cf. Dervin, 1999b, p. 731). Nouns stand for relatively stable representations of reality, e.g., facts, whereas verbings such as factizing imply the ways in which these facts are approached as something malleable, challengeable, and thus, designable in a specific context. Importantly, the above characterizations suggest the view that such designing activity constitutes the process of information use.

Given these characterizations of information use, the connection between the source domain and the target domain seems to be even more difficult to specify than in the case of early sense-making research. The concept of gap-bridging does not provide here an obvious clarification for the concept of designing of information (fodder) as a specific verbing. The setting is complicated in that in itself, gap-bridging can be interpreted as a verbing activity. However, despite these contingencies, gap-bridging illustrates the basic nature of designing information because the concept of gap-bridging suggests that ultimately the designing of information is dealing with constructing or shaping activities; for example, developing ideas. Thus, again, we end up at the root metaphor of “construction.”

We may conclude that ultimately the characterizations of information use suggested by both early and more recent sense-making draw on the metaphor of construction that is conceptualized in the context of step-taking. Early sense-making characterized the qualities of constructing or shaping implied by gap-bridging as “modification of internal pictures” (Dervin, 1983), whereas more recent sense-making refers to the qualities of constructing or shaping as “designing input/ fodder for sense-making” (Dervin 1999b). In other words, when conceptualizing information use from the viewpoint of the gap-bridging metaphor, the constructing or shaping of things is thematized as the ultimate horizon of understanding.

Discussion

Sense-making methodology mandates a highly flexible and context-sensitive approach to information use. Sense-making and gap-bridging may manifest in myriad ways, and they are not always deliberate, instrumental, purposive, and goal-oriented. The phenomena of information use are defined in an inclusive way. Emphasis is placed on the multiple contingencies that affect the processes dealing with the designing of fodder for sense-making. In practice, information use may denote the employment of all kinds of cognitive and affective elements that may help to make new sense. Hence, information use can be conceptualized as one of the ways in which sense is made and unmade. Importantly, both sense-making and specific activities that are instrumental to it, for example, information use, are conceived of as gap-bridging. Thus, the metaphor of gap-bridging is constitutive of the sense-making methodology as a whole, and ultimately, all phenomena of sense-making can be reflected by drawing on this root metaphor.

Even though the source domain-level conceptions of gap-bridging can be mapped only partially onto conceptions about
information use in the target domain, the analysis revealed that gap-bridging provides a fruitful starting point to make the phenomena of information use more understandable. In early sense-making studies, information use was conceptualized by referring to the modification of internal pictures. In recent sense-making, the designing activities are conceptualized as diverse verbings. The concept of construction is constitutive of both the early and more recent sense-making approaches to information use. However, in recent sense-making, construction refers more clearly to the shaping of cognitive and affective elements in intra- and intersyonic (discursive) contexts.

Importantly, the metaphor of gap-bridging opens a nonessentialist viewpoint on the phenomena of information use. This means that information use is not approached as a process that draws on relatively stable mental models, cognitive styles, and other noun-related factors that determine how information is evaluated and encompassed. In contrast, the metaphor of gap-bridging provides heuristic tools guiding the positioning of questions of how people seek, interpret, and design information.

From the methodological and heuristic point of view, the metaphor of gap-bridging is useful in that it guides us to pose contextually sensitive questions, which are important for the empirical analysis of information use processes. Ultimately, these questions deal with the “hows” of gap-bridging. First, how people draw on their internal resources such as ideas, experiences, beliefs, and emotions in gappy situations. Second, how they draw on external resources, for example, advice received from an expert, Web pages, and newspaper articles. Third and most importantly, how they design or shape—for example, by comparing and relating—the various elements received from these sources. Articulated answers to these questions yield material for the empirical analysis of information use processes. So far, we lack empirical studies focusing on the processes of information design from this perspective.

On the other hand, the specific nature of the sense-making categories—as exemplified by the concept of input/fodder versus information—may result in difficulties for researchers outside the sense-making discourse community relating to their understanding of the methodological tools provided by this approach. Certain concepts, for example, verbings may not be found as easily approachable and they connote varying meanings.

This difficulty may be aggravated by the fact that the abstract concepts and methodological tools cannot be easily transferred to other theoretical frameworks. Sense-making operates on three levels of abstraction:

- **Metatheory**—Ontological, epistemological, and ideological assumptions concerning, e.g., verbings
- **Methodology**—Reflective analysis and development of the “hows” of theorizing, observing, analyzing, and interpreting, e.g., how to approach gap-bridging
- **Methods**—The specific “hows,” that is, techniques such as time-line interview, guided implicitly or explicitly by methodological considerations (cf. Dervin, 2003, pp. 136–137)

To utilize the potential of sense-making, the “whole package,” that is, all levels of abstraction should be taken into account. For example, if time-line interview is taken out of this context as a specific method to gather empirical data about the processes of information use, there may be problems deriving from the “partial” use of sense-making. There may also be translation problems between the vocabularies of sense-making and other approaches. These problems may render it difficult to compare research findings obtained within alternative research frameworks because they may suggest different operationalizations of the phenomena of information use.

However, the “translation problems” do not seem to be insurmountable. For example, Todd (1997; see also Todd, 1999) discussed the operationalization of the Brookesian fundamental equation from the angle of the cognitive viewpoint. In his study, the processes of information use were described by expressions such as “appending,” “inserting,” and “deleting” (of specific knowledge structures). Interestingly, the outcomes of these processes seem to have similarities with the outcomes of information use characterized in sense-making studies, for example, as “get a complete picture, get a clearer picture, get a changed picture, get a verified picture and get a position in a picture” (Todd, 1997; Todd, 1999, pp. 20–21; cf. Dervin, 1983). Obviously, we may arrive at similar results by walking alternative paths, even though these paths start from opposite angles, in particular as far as the assumptions of the nature of information are concerned.

**Conclusion**

Gap-bridging is an open-ended and theory-constitutive metaphor that affords epistemic access to various phenomena of information use. In the future, there will be a need for the further specification of the potential and limits of the gap-bridging metaphor. In addition, it would be useful to link these analyses to empirical findings describing various manifestations of gap-bridging in different settings. There is also a need for more detailed comparisons of the concept of gap-bridging to other approaches to information use, for example, the viewpoint provided by social constructionism (see Tuominen & Savolainen, 1997). Overall, putting sense-making in a comparative perspective would reveal more clearly the potential of sense-making and perhaps elicit views concerning its development as an approach to information use.

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