A Semiotic View of Information: Semiotics as a Foundation of LIS Research in Information Behavior

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Traditional information behavior studies in library and information science (LIS) research have focused on primarily two trends: one is to provide physical access to material objects and the other is to direct users to certain thoughts and ideas. Both focuses are two sides of the same problem that LIS researchers have worked to address: how to provide a better system or service to accommodate people's need for information. Among the domains of users, material objects, and meaningful ideas, applying the concept of information as sign with semiotics not only joins these two trends in the analysis of the pragmatic-syntactic relationship and the pragmatic-semantic relationship, but it also gives an additional focus on the syntactic-semantic relationship. It is this additional focus that helps LIS professionals/researchers understand an individual's states of knowing and ways of obtaining knowledge through physical and mental interactions with informative objects. The author conducts a review of information studies, the epistemological concerns and pragmatic traditions in LIS, and semiotics in an attempt to seek a holistic principle that will incorporate both the traditional trends of LIS research and provide an additional awareness in assisting users to make connections between material objects and ideas in information behavior studies. By applying a semiotic view of information and the concept of information as sign, LIS researchers of information behavior will find semiotics a useful epistemological framework.

Introduction

"Information" as a term, concept, or subject of study poses a problem for anyone who wants to define it in a comprehensive way. The study of information has proved to be diverse, and it is difficult to restrict its definition (Machlup & Mansfield, 1983). Many use the term "information" to refer to facts, knowledge, news, and opinions delivered and

received during people's various interactions with different media in the surrounding environment. Through the years, different scientific fields have developed various theories in telecommunication, computer science, and linguistics based on different definitions of this word that is commonly used in people's daily life.

The library and information science (LIS) research particularly focuses on providing people with access to relevant information. This focus includes the emerging sub-discipline of the study of information behavior within LIS. The study of information behavior, especially information seeking activities, comes from the observation of interactions between people and material objects to understand how humans obtain knowledge in an individual or social level. Wilson (1999, p. 249) stated that information behavior is "the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use." Pettigrew et al. (2001, p. 44) defined information behavior as "how people need, seek, give and use information in different contexts." Many theories and models about information behavior have been developed since the mid- to late 1990s following the long-standing tradition of LIS research seeking a better understanding of relationships among users, material objects, and ideas of thoughts (Fisher et al., 2005, xix). To provide a better system or service to accommodate people's need for information, information behavior research faces the complex challenge of bringing two traditional trends together: providing not only the physical access to material objects but also access to the ideas that a user needs in different situations in order to meet the purpose of increasing a user's knowledge in a certain domain. To meet this challenge, many scholars have proposed different approaches based on positivism, pragmatism, and phenomenology in LIS research (Budd, 1995, 2005; Hjørland, 2005a, 2005b; Pettigrew & McKechnie, 2001; Sundin & Johannisson, 2005). Information behavior in LIS research can be seen as influenced by the concerns of epistemology because obtaining useful knowledge is the main purpose of an information seeking activity (e.g. Budd, 2001; Hjørland, 2002). The concept of information behavior is the act of "communicative participation" between human and information, where knowledge is "enacted through linguistic and physical actions whose significances and relevance are judged by the consequences of such actions." In other words the outcome of an information seeking activity depends on whether the information can satisfy the purpose of increasing a person's knowledge in a certain domain. Since the success of an information seeking activity depends on whether a person is satisfied with the results, and success hinges on the practical results of a person's actions, it is considered "pragmatic" (Sundin & Johannisson, 2005, p. 24). We should take a closer look at what pragmatism suggests regarding how people obtain knowledge.

Classical pragmatism created by Charles Peirce (1839-1914), William James (1842-1910), and John Dewey (1859-1952) is an American school of thought in

philosophy. Pragmatism states that knowledge is obtained through a person's struggles with the environment, and it is through systematic or unsystematic inquiries such as education, training, trials, practice, and social interactions that “things in the surroundings” become meaningful and useful to the individual. Therefore, pragmatists are concerned with the way individuals make and understand meaning, so that obtained knowledge becomes useful to cope with the challenges given by the surrounding environment. Peirce (1960) coined a triadic approach of investigating the relationships among intelligent interpretant, symbol vehicle, and meaning of truth to explain the state of knowing. Peirce’s approach started the study of signs, semiotics (or semiology). Semiotics provides an analytical and complementary view that suggests a person’s state of knowing is through the process of deriving meanings from representations or of creating representations to express meanings in an environment. The process of creating and understanding meanings from signs can be divided into semantic, syntactic, and pragmatic dimensions. The semantic dimension discusses the meaning of signs (designatum); the syntactic dimension deals with the representation of signs (vehicle); and the pragmatic dimension focuses on the user of signs (interpretant). The triadic relationship of these three dimensions provides a fundamental framework for analyzing how people interact with various media and derive meanings from them in an environment. This shares a great similarity with the study of how people seek information in need with a given system.

In this paper, I will attempt to show that the semiotic perspective of systematic inquiry for knowledge will lead to a more holistic understanding of the subject of information behavior in LIS research. This presentation of a semiotic view of information hopes to offer a useful epistemological framework that would incorporate traditional trends of LIS research and provide additional principles for information behavior studies in the future.

The Ambiguity of Information and the Studies of Information

Information is an ambiguous concept. While people casually use the term “information” in many ways, to arrive at a precise definition that is agreeable to most of those who consider themselves information scientists appears difficult. The concept of information is closely related to other concepts such as data, news, message, instruction, knowledge, meaning, communication, sign, and stimulus. Many speak of “information” to loosely replace other specific terms used to describe people’s various interactions with different media in their environments. Meanwhile, different scientific fields have their own approaches to the study of information, each with different measurements and types of data to either generalize or restrict the operational definition of “information.” The diversity of the study of information makes finding a comprehensive definition difficult

(Machlup & Mansfield, 1983, p. 1). For instance, Svenonius (2000, p.7) regarded information as "something received or obtained through informing" and as "the content of a message or something that is communicated." On the other hand, Buckland (1991) classified types of information based on the concept of "information as thing." Svenonius and Buckland's definitions of the term "information" show two different attitudes regarding the use of the word: one is to generalize the sense of the term through the act of informing, and the other is to restrict it to refer to specific material objects. According to the Oxford English Dictionary, the earliest historical meaning of the word information in English was "the act of informing, or giving form or shape to the mind, as in education, instruction, or training" (1387), and can also refers to "an item of training" (1386). The lexical explanations of the word show that to understand information involves at least two parts: the act of informing and the item used to inform, and Svenonius and Buckland's definition of information echoes the traditional use of the term.

Despite the original lexical explanations, common treatments of the term "information" in different scientific fields are so diverse that scientists use the word/term to refer to ideas that appear dissimilar or have no associations to each other. In Machlup and Mansfield's The Study of Information: Interdisciplinary Messages, thirty-nine scientists across nine different fields explained their concepts of "information" in their disciplines. These fields include cognitive science, informatics, artificial intelligence, linguistics, library and information science, cybernetics, information theory, system theory, and social science. "Information" in different fields represents deviating concepts or measurements according to different operational definitions. For instance, information in cybernetics, the theory of communication and control of feedback, specifically means the feedback signals in an organic or mechanical system. On the other hand, understanding how information is communicated with linguistic methods focuses on deciphering the characteristics of human languages. Thus, in order to determine what scholars and scientists mean by "information" in their own terms, it becomes critical to first understand a field's culture. The diversity of cultures in the study of information illustrates a combining set of disciplines in science and the humanities, which leads to an interdisciplinary exploration that is not restricted to a research territory that can claim to have achieved a comprehensive understanding of information (Machlup & Mansfield, 1983, p. 4).

Despite the rich advancements in the studies of information, many concepts of information, as Capurro and Hjørland (2002, p. 396) concluded, "are embedded in more or less explicit theoretical structures," and "in studying information it is easy to lose one's orientation." Machlup indicated that various definitions of information developed by scientists have deviated from the two traditional meanings of the word, "the telling of something" and that "which is being told." He further stated that any restricted definitions "are either analogies and metaphors or concoctions resulting from condoned

appropriation of a word" (1983, p. 642). Nevertheless, to understand such an ambiguous concept as information studies shows, we cannot help but seek an operational definition of a term or quantity, which would inevitably make differences in the theoretical approach we use. Unfortunately, the study of information becomes so complex that, in certain circumstances, it is akin to defining "meaning," a subject that scholars and scientists tend to avoid when developing theoretical models of human communication for practical use.

Claude E. Shannon, the father of information theory who engineered a breakthrough in modeling telecommunication process, noted that "...messages (information) have meaning; that is they refer to or are correlated according to some system with certain physical or conceptual entities." But he succinctly stated, "These semantic aspects of communication (the act of informing) are irrelevant to the engineering problem" (Shannon & Weaver, 1963, p. 1). Despite Shannon's technical triumph in his original writing in 1948 when he equated information to entropy, a logarithmic quantity, and successfully isolated communication signals from the meaning of information, which led to the fruitful development of telecommunication technology, the mathematical approach of defining information had its own limitation. Klir and Wierman (1999, p.5), while working to provide mathematical measurement of information based on the concept of reduced uncertainty, admitted that "information measured solely by the reduction of uncertainty does not capture the rich notion of information in human communication and cognition," and "it is not explicitly concerned with semantic and pragmatic aspects of information viewed in the broader sense." In a broader sense, "information" is therefore inappropriate to be restricted as a stand-alone object or a mathematical entity.

Research in LIS particularly focuses on providing people with access to relevant information. Thus, LIS research primarily aims to understand the process and result of people's information seeking activities, and the relevance of the result holds the key to the satisfaction of a person's information needs. "Information" in this regard is the obtained meaningful product of consequential actions of a person's information behavior, which Wilson (1999, p. 249) and Pettigrew et al. (2001, p. 44) defined as "the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use" and "how people need, seek, give and use information in different context." Information behavior analyzes not only the apparent physical behaviors of using the system, but also the epistemological development of an individual such as how people obtain knowledge through derived meanings during the interaction with the system and information facilitated by it (e.g. Budd, 2001; Hjørland, 2002). This distinctive interest of LIS research in epistemology will lead us to a closer look of how meanings are made and understood by individuals in various states of knowing.

The Epistemological Concern and Philosophical Pragmatism in LIS Research

The emphasis on epistemology for both research and practice has influenced LIS research (e.g. Budd, 2001; Hjørland, 2002). Jesse Shera asserted that LIS is fundamentally an area of practice and service that is concerned with bringing the human mind and information together in a productive relationship. The process of bringing the human mind and information together should serve as guides to the "substantive contact of graphic records" in a systematic inquiry for knowledge where Shera believed that "ideas, rather than processes, tool, instruments, controls, gadgets, computers, methods, or means, must be the primary concern of librarianship" (Harmon, 1987, p. 215). Thus, the service of librarianship should not stress providing physical access to material objects over and above offering directions to the substantive content of ideas. The result of an information behavior must appear meaningful to the user in order to accommodate the process of obtaining knowledge about a certain subject domain.

The epistemological concerns for librarianship indicate the problems of intellectual and physical access to recorded knowledge, which LIS research usually faces. Therefore, to achieve a holistic understanding of a user's information behavior, LIS research must extend the discussion to take in not only a user's physical behaviors but also a user's state of knowing. Understanding humans' states of knowing has been traditionally discussed in the philosophical community, and many scholars have proposed different philosophical approaches based on positivism, pragmatism, and phenomenology to help establish better epistemological tools to understand the phenomena of information behavior in the LIS research (Budd, 1995, 2005; Hjørland, 2005a, 2005b; Pettigrew & McKechnie, 2001; Sundin & Johannisson, 2005). In an extensive introduction to pragmatism and neo-pragmatism, Sundin and Johannisson (2005, p. 24) suggested that knowledge is "enacted though linguistic and physical actions whose significances and relevance are judged by the consequences of such actions." Classical pragmatism has been regarded as an American tradition in philosophy developed by Charles Peirce (1839-1914), William James (1842-1910), and John Dewey (1859-1952). Generally speaking, a "pragmatic" approach of thinking is that a person is principally concerned with the "practical results of his/her actions" (Sundin & Johannisson, 2005, p. 26). From a pragmatic view, whether or not knowledge is meaningful depends on how useful it can help an individual cope with the challenges given by the environment (Sundin & Johannisson, 2005, p. 27). Therefore, pragmatists are particularly interested in understanding how meanings are made and understood by individuals' struggles with the surrounding environment and how individuals determine the significance of an idea at the end of consequential actions of the struggle.

While empiricism and logical positivism offer that knowledge is viewed as something to be discovered by the observant individual, the significance of pragmatism indicates that obtained knowledge or belief is the result of an individual's thinking in the struggle of coping with the challenges given by the surrounding environment. Rorty (1999, p. xxiif) noted that with a Darwinian explanation, pragmatism establishes its approach regarding knowledge as tools that will enable human beings to better survive in their environments. As Murphy (1990, p. 23) and Perice (1955, p. 270) stated the sole function of thought is the production of beliefs upon which an individual is prepared to act. Pragmatism thus denies that ideas without practical usefulness have a fundamental value for an individual. James (1975, p. 34) further argued that to determine the significance of an idea or theory is to see if it serves a certain purpose or has the power to "work." Pragmatically speaking, knowledge does not mean to reflect the outer world, which is contradictory to the Cartesian paradigm, but serves the purpose of assisting people to cope with their problems according to their situations. Whether an idea or theory becomes true or not is a question of whether it provides a useful tool in making any difference to practice (Sundin & Johannisson, 2005, p. 27).

Pragmatism's emphasis on how instrumental an idea or theory is to human purposes becomes critical in judging the value and significance of a systematic inquiry for knowledge. A typical pragmatic question is: "What differences does the result of our actions make?" Hence, to determine the significance of the consequences of an information behavior depends on how useful and meaningful the results appear to the individual who interacts with the system, which is traditionally an important concept appearing in LIS research such as user-centered approach of system design.

A Semiotic View of Information in LIS (Information as Sign)

Classical pragmatism deals with the instrumental relations among people, ideas, knowledge, actions, and environments; however, as Murphy (1990, p. 25f) noted, it does not offer an explicit explanation of how these relations are established. Peirce and Dewey believed that the ability to use language is critical in the process of knowing, and linguistic communication is the most important human practice. Thus, how specific ideas are communicated through languages becomes important to pragmatists (Rorty, 1990, p. 3). The concept of sign is essential with regard to language as a tool of systematic inquiry. Understanding signs shares a common bond with understanding the process of the act of reading (Brier, 1996; Wagner, 1992; Warner, 1990). Given the reason that the simplest act of reading is to let humans become informed by interpretation, "it is the nature of the sign to be at least potentially informative (interpretable), available to be read and open to

interpretation" (Raber & Budd, 2003, p. 508). With the act of reading, humans are informed by signs or informative objects and, consequently, obtain ideas and knowledge from them.

To understand how meanings are created and understood with language, Peirce's study of signs focused on "the processes and effects of the production and reproduction, reception and circulation of meaning in communication" (Hodge & Kress, 1988, p. 261), which is the complementary process among components of the sign that gives meaning. Peirce (1931) established the fundamental triadic relations of three components of the sign, which Morris (1938) later designated as the semantic, syntactic, and pragmatic dimensions. The observation of semiotics was based on a view of how humans (interpretant) establish the connection between signifier (representation) and signified (meaning) in an environment. Figure 1 shows the Peirce-Morris semiotic model of the concept of information as sign and the corresponding dimensions base on the Ogden Triangle (c.f. Johansen, 1993, p.62; Ogden & Richards, 1923). The semiotic triangle illustrates the relations among the user of information, the representation of information, and the meaning of information. It suggests that the information is created by users, establishing the connection between the act of understanding representative symbols or objects and the production of signified meanings in a functional communicative environment.

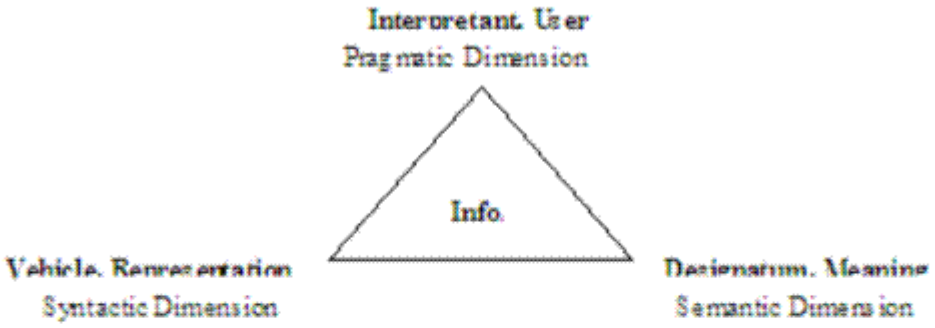

Figure 1. Information as Sign based on Peirce-Morris Semiotic Triangle

Figure 1. Information as Sign based on Peirce-Morris Semiotic Triangle

Based on Ledger Wood's concept of "referential transcendence," which stated that knowledge is always of or about an actual or supposed object, Shera proposed a similar triangular structure, suggesting that the process of knowing is a unity of subject, vehicle, and object. "The subject is the self, the perceiver; it may even be understood as the simple act of awareness. The vehicle encompasses all that is given to the subject through which it knows the object. The object is the ultimate goal or referent of knowledge, it is that which the knowledge is "about" (Shera, 1972, p. 13). Shera indicated that in the library situation, the library user is the subject; bibliographic apparatus is the vehicle; and the library's recorded materials is the object. Shera's model corresponds with the semiotic triangle and suggests that once the subject (the user of information) establishes the connection between bibliographic apparatus (the representation of information) and the object, the subject will ultimately obtain knowledge (the meaning of information) from the results of this process. However, by accepting the concept of information as thing (Buckland, 1991) to discuss the interactions between users and informative objects, the object Shera refers to can be simply the representation of information that does not necessarily have inherent meaning. From a semiotic view of information, the process of bridging an informative object (signifier) with a specific idea (signified) is not as simple as it appears. As Raber and Budd (2003, p. 508) indicated, "the relation between signifier and signified can be complex, as is the case in the relation between a text and its content." So, understanding what an informative object (book, article, record) signifies, what it is about, and its relevance or significance to the user, is not an easy task.

LIS and semiotics share concern with how humans establish the connection between representation and meaning, as Raber and Budd (2003, p. 509) summarized two fundamental problems of information retrieval: one is to assign accurate and adequate representative descriptions for an informative object upfront, and the other is to assess the relevance of retrieved results on the backend. These two problems are akin to the concern with language that is used as a tool of systematic inquiry for knowledge discussed in semiotics. The upfront problem of representative description about an object, which is similar to what Saussure (1959, p. 9 and 11-13) referred to as the "parole situation" in speaking, is that texts are created for the purpose of communication between individuals and are "unique products of choice," that is they are unlimited in variations of what they could be (Raber & Budd, 2003, p. 510). The choices among the signifiers (representation) that can link to a certain signified (meaning) could be unlimited because of the nature of syntactic codes. In the library situation, bibliographic apparatus (signifiers) without control will lose its accuracy and adequacy in representing an informative object

(signified). On the other hand, the backend problem of the relevance of retrieved results, which is close to what Saussure (1959, p. 14) referred to as the "langue situation" in language, is that the content of a text "is a social phenomenon, constrained by history and culture, and manifests shared concepts and meanings from which texts are constructed" (Raber & Budd, 2003, p. 510). The semantic attribute of a sign is created in the moment of determining the significance of the connection between the chosen signifier (representation) and the signified (meaning). How this signifier-signified connection is established is greatly influenced by an individual's differences in both personal and social levels. Thus, an informative object that is useful (meaningful) for one person might be useless (meaningless) to another. Accordingly, in the library situation, the assessment of the retrieved results' relevance will depend on the users' judgment of how well the retrieved information fulfills their purposes.

The concerns of pragmatism with epistemology show that knowledge is the significant consequence of individuals' struggles with their environments. As "information" is the product of the act of informing, the concept of "information as thing" must establish that informative objects are signs in order to extend the discussion of the users' physical interactions with the system to include their mental states of knowing in information behavior research. Semiotics suggests that to understand how an interpretant (the user of information) constructs the relation between a signifier (the representation of information) and a signified (the meaning of information) is making a complementary joint to understand how a user find an informative objects (physical interactions with the system) and obtain meaningful ideas from it (mental state of knowing) at the same time. In a library situation, the user's struggle to retrieve information in need is a repetitive practice of constructing significant connections between bibliographic apparatus and informative objects, between text and content, and between content and knowledge (Raber & Budd, 2003, p. 516), which hopefully will lead to the understanding of a certain "idea," as Shera referred to it. The concept of information as sign, which suggests that information's material and cognitive aspects are equally important, echoes Neill's (1987) assertion not to exclusively focus on either side of the aspects in the study of information, and provides a complementary way to connect both aspects together for a more holistic view of LIS research.

Semiotics as a Foundation for LIS Research in Information Behavior

Early development of computer and information science regarded semiotics as its paradigm and expected a broader application of it in language-based programs (Gorn, 1983; Pearson & Slamecka, 1983). Andersen (1991) defined computer semiotics as the study of computer-based signs and the ways they function in communicative

environments. In addition, recent semiotic applications in computing and information system design have suggested that the concept of semiotics is useful in the development of semantic network, information systems, indexing, and natural language processing (e.g. Andersen, 1997; Calway, 1995; Gonzalez, 1997; de Souza, 1993; Liu, 2000a, 2000b; Liu et al., 1998, 1999; Mai, 2001; Resnik, 1999; Stamper et al., 2000). The approach of semiotics exemplifies a workable model and three potential areas to address in the study of information. Figure 2 illustrates an example of applying semiotic concepts using entity-relationship diagram (ERD) (Chen, 1976) as a graphical notation for a conceptual model that reflects an information behavior situation.

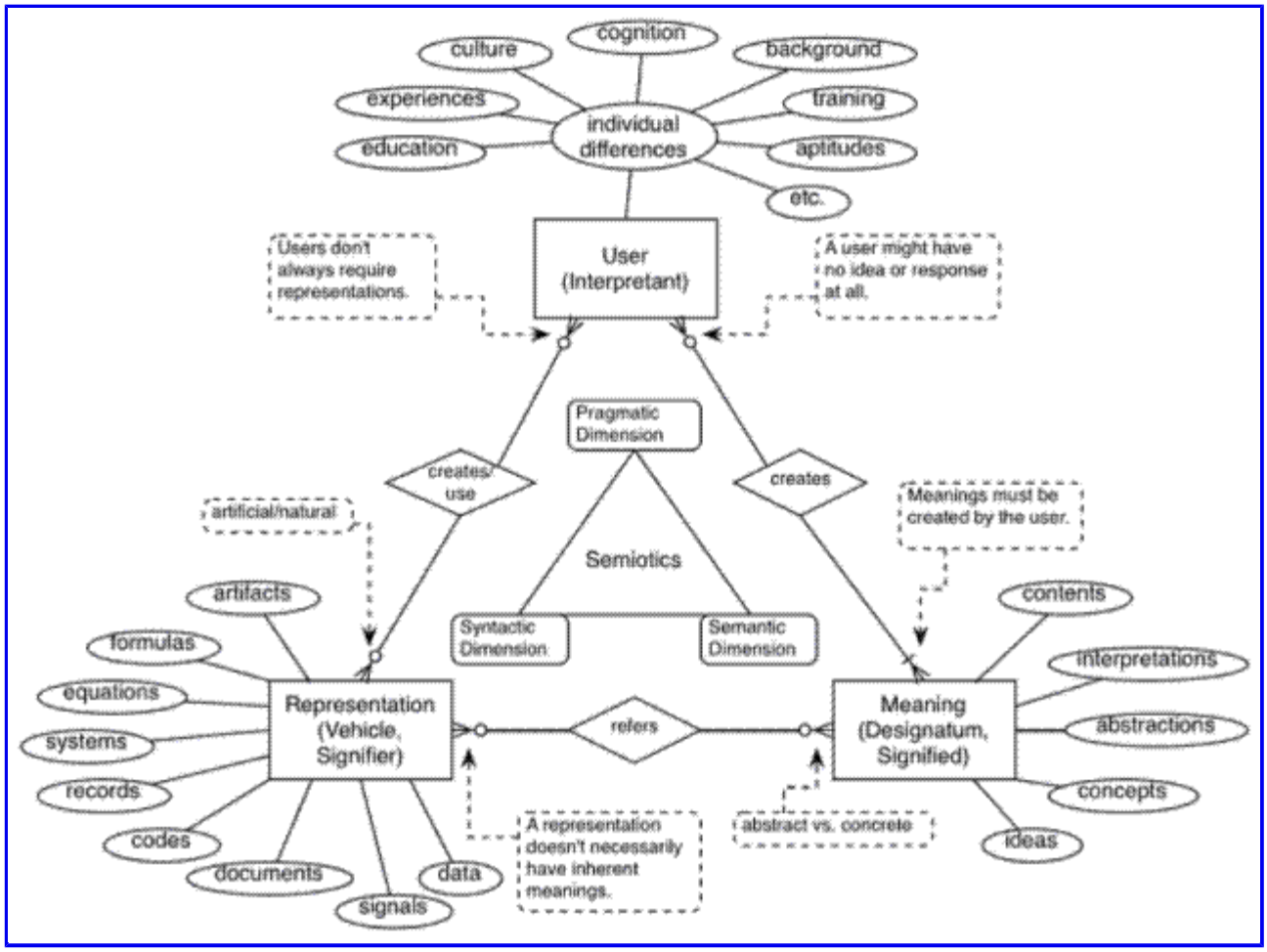

Figure 2. An entity-relationship diagram that reflects semiotic concepts

LIS has traditionally focused on either providing more convenient access to informative materials or offering more instrumental directions to certain schools of ideas for users with a system. The benefit of defining information with the semiotic triangle is that it provides a more holistic observation of the relations among the user, the representation, and the meaning in the act of informing, which does not partially focus on either the material or cognitive aspect of the LIS research. The triadic concept of semiotics suggests

three dimensions and three relations to be analyzed in information behavior studies. The pragmatic-syntactic relation can be seen as the discussion of how users interact with the informative materials. The pragmatic-semantic relation can represent the focus on how users are directed to a certain school of thought. In addition, semiotics reminds us of the complex syntactic-semantic relation between representation and meaning to be more carefully addressed, which in most cases, we assume that users will automatically obtain the knowledge they want once they acquire the "right" informative materials through the iterative practice of connecting signifier and signified.

Semiotics has, with reference to Peirce, been applied in IR and indexing (e.g. Blaire, 1990; Brier, 1996; Mai, 2001), which shows its influences in LIS research. However, the concept of information as sign has not yet become a fundamental idea of information behavior research in LIS, which is perhaps due to the reason that the researchers have not seen the potential of using semiotics as a foundation or a guide for theoretical development to connect both the material and cognitive aspects of information behavior studies. The development of theories of information behavior appears to be scattered, which is similar to the frustration expressed by Fairthorne (1975) about information science: there are too many labels (theories) for one bottle (information behavior). The lack of a more holistic approach that can incorporate the epistemological concern in LIS to provide a more effective and efficient service and system for users to access the informative materials they really need leads to a realm having diverse or partial explanations of either the material or cognitive aspect in information behavior research. While we can argue that partial explanations contribute parts of a whole picture, it is also dangerous to have not a holistic view of the picture in the first place. Thus, I propose three principles based on semiotics and pragmatism to accommodate for the lack of a holistic scope for LIS research in information behavior:

1. The judgment of the consequences' significance in information behavior is to acknowledge how instrumental the results of a systematic inquiry for knowledge are to the individual. The relevance of information acquired thus depends on the perceiver/user's judgment of its usefulness to serve his/her purposes. This principle is a long-standing tradition emphasizing the user-centered approach, and in the sense of pragmatism, information behavior research should help understand and ease the user's struggle of finding the "right" materials in a given system by judging the relevance of information base on the user's perspective.
2. Despite being a critical part in information behavior, representation as the items of informative objects is independent from meaning. Thus, the focus of understanding the process of an individual's information behavior is to identify one's practice of establishing the connection between representation (signifier) and meaning (signified). The practice of connecting informative materials to a school of thoughts

or ideas that will increase users' domain knowledge includes both material and cognitive aspects of information behavior. Not only should information behavior research identify the sequential steps of a systematic inquiry, but also draw relations to the development of the user's states of knowing.

3. By accepting the concept of information as sign, three dimensions, including the pragmatic dimension, the semantic dimension, and the syntactic dimension, and the relations among them are to be analyzed as a whole in information behavior research. Semiotics suggests that these three dimensions share a complementary bond to explain how people need, seek, give and use information in different contexts in order to obtain knowledge that serves their own purposes.

Conclusion

Science, a way of systematic inquiry according to Pickering (1995), is the mangle of practice. From a pragmatic view of the process of knowing, while libraries serve as the institutions of knowledge organization to accommodate people's information needs, seeking, and use, the experience of using a library has an individual encounter the intertwined challenges of machines, instruments, systems, and social practice that Pickering described as "the mangle" of the systematic inquiry for knowledge. The tradition of librarianship, according to Shera, is to provide both physical access to informative materials and direction to "ideas." The question is: "Can LIS research find a way to ease individuals' struggles with their environments in the quests of obtaining knowledge?"

A common agreement among LIS researchers is the complexity of the study of people. To design a system in which human factors are involved often includes the challenge of understanding the mental states of human minds and the apparent physical behaviors of people at the same time. Information behavior in LIS research is "the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use," defined by Wilson, and faces the same trials as understanding both the material and cognitive aspects of the relation between people and their use of information. "Pragmatism (in LIS) is used to label, for example, principles for knowledge organization that are built on individuals' wishes and behaviors" (Sundin & Johannisson, 2004, p. 31). In addition, Raber and Budd (2003, p. 507) indicated, "Both semiotics and information science are concerned with the nature of the relations between content and its representation, between signifier and signified, between reference and referent, and between informative objects and their meaning." Both pragmatism and semiotics have provided directions for answering questions in LIS research. I believe that the principles derived from semiotic pragmatism to help determine the consequences of a systematic inquiry for knowledge and analyze the relations among

the user, the representation, and the meaning of information, can establish a more holistic approach, one that does not exclude either the material or the cognitive aspect for the study of information behavior in LIS research.

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