

A pragmatic semeiotic perspective on the concept of information need

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Abstract

The concept of information need is a core concept in library and information science (LIS) that describes the state of uncertainty or anomalous knowledge state that precedes a user's information seeking behavior.

Information need is, however, an intricate concept, and is only addressed in the LIS literature as some kind of elusive cognitive state.

The present paper argues that the concept of information need may profit from a pragmatic and semeiotic perspective.

The paper thus discusses the concept of information need through four premises that is formulated based in Peirce's pragmatic semiotic.

Introduction

The general conception of knowledge organization means bringing knowledge into some kind of order or structure. However the knowledge considered for organization is that which is materialized in different kinds of media, and therefore knowledge organization is more precisely defined as the research area within information science that has a particular interest in the organization of recorded knowledge, which in principle is the same as information. Even more precisely, though, knowledge organization is really focused on types of systems, modes of representation, purpose of information architecture, interaction design etc., in fact knowledge organization despite its terminology is very little concerned with knowledge as phenomenon, how it is communicated and interpreted within communities, but mostly concerned with general and nomothetic features of information systems in order to accommodate users in their information seeking process. Consequently, evaluation of KOS tends to be more concerned with how well objects of knowledge are represented within a particular semantic structure, than with how the KOS in principle acts as sender in a communication process. As such, the basic function and purpose of KOS can be summarized as:

- 1) facilitating information retrieval (IR-function),
- 2) providing information about documents (document information function - document surrogate (representation)), and
- 3) providing shelf arrangements (ordering function) (Broughton et al., 2005).

In the terms of Buckland (1991), these aspects of KOS all relate to the 'information as thing' paradigm. Following this line of thought, information is related to physical items, or immanent qualities of objects.

Information in relation to knowledge or knowing, however, changes the perception of information, because knowledge or knowing implicates intelligible conduct. Intelligent conduct, use, consumption, interaction, communication and meaning adds complexity to information, and the object as such becomes secondary. Consequently, investigating KOS disregarding the implications of knowledge, and the processes of becoming knowing through interaction, where the actor's level of knowledge intentionally and purposefully is reflected, and altered by how representations are offered in KOS architecture, tells only one side of the story

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The other side, however, is not as well described as the former. It has not been neglected, several LIS scholars has argued about the importance of including users and their interactive behavior in information seeking and IR, e.g. in particular in terms of 'sense making' as suggested by Dervin (1998) and learning and seeking meaning in the information seeking process (ISP) as formulated by Kuhlthau (Kuhlthau, 1991, Kuhlthau, 2004). Also, the cognitive approach in information science, generally formulated in terms of the cognitive view, formulates users propensity to approach information systems, in terms of the idea of an anomalous state of knowledge (ASK) (Belkin et al., 1982), which labels the prerequisite cognitive state of an inarticulate information need that motivates a user to approach an information system in order to satisfy what sometimes is referred to as a "knowledge gap", which in some cases addresses the distance between the user seeking information and the information system representing information. In other cases the knowledge gap addresses what the user know about a problem or a topic and what the user need to know in order to solve the problem (Kuhlthau, 1991). However, the process of becoming aware of an ASK, a knowledge gab etc. how is it actually recognized? How does a user know what to look for if an information need, in terms of ASK, is inarticulate, or a vague feeling of uneasiness, and when does the user know that the ASK is fulfilled? Consequently, we need to reflect on the process that motivates a conscious but inarticulate state of information need, and we furthermore need to reflect on how user satisfaction is assessed.

This paper is in line with Buckland's understanding of information and investigates information in relation to knowledge, or more precisely the process of becoming knowing, not disregarding the importance of information systems in terms of structure/architecture organizing physical items of recorded knowledge, but by at one hand taking the perspective of information as the 'means' for 'knowing', hereby defining structure/architecture as the fundamental 'grammar' of representation that affect a user to act in a certain purposeful yet limited manner, and at the other hand, taking the cognitive effect motivated by representations as a determination of goals, it may be possible to rethink the relations between representation and cognition (information need) in information systems interaction in terms of a dynamical communicative process.

Stating the scope

This paper formulates a theoretical framework that unites the interrelated functions of representation, communication and meaning. As argued above, KOS are systems of representation, that more or less sophisticatedly organize semantic units and their relations, however, KOS goes beyond self-referential formal structures, because KOS affect minds, e.g. in terms of relevance assessment, in terms of behavior e.g. how to proceed the interactive process of information seeking, in terms of acquisition of information sources, etc.

Furthermore, this dyadic relation between representation and conduct is constrained further by contextual circumstances, both by the architecture of system itself, but indeed also by the knowledge possessed by the user of KOS. KOS are therefore considered systems that represent semantic units and their relations that that reaches beyond the formal structure and internal order by motivating cognitive processes in human minds, that again are delimited by certain contextual barriers and preferences.

However, why seek information in the first place? And why are users inclined to seek information in bibliographical databases? These questions in the LIS literature are often related to a conception about incomplete personal knowledge, and its fulfillment by means of information sources. However, what is incomplete knowledge, and how does an individual acknowledge this incompleteness? What triggers the awareness of information warranted? These questions are not simply a matter of matching a knowledge gab. The ideas of information need expressed in terms of

incomplete knowledge structures as e.g. formulated in terms of Belkin's ASK and successively knowledge gap, I consider metaphors that lead to a fundamental misconception about information and knowledge. How does e.g. information transform into knowledge and vice versa? For, when addressing the problem of information retrieval in terms of ASK, reasoning about it follows the path of matching knowledge structures, like puzzle solving, as if the right picture is out there, obscured by unclear individual and psychological knowledge structures. However, this metaphor also leads to what may be named the information seeking paradox: How is it possible to seek information in the first place, if what one seeks is unknown or unclear? And, how does one know that ASK has been overcome, and the knowledge gap is fulfilled? And then, why seek information in the first place if the information is known? These questions are of philosophical nature, and different theories about information and knowledge provides for different possible answers. Addressing the question about information need and knowledge structure from a pragmatic and semiotic perspective has some advantages that may be useful in LIS. Firstly, by seeing information systems and knowledge structures as fundamentally different semiotic structures, we are able to establish a clear distinction between information and knowledge. Secondly, by arguing that information seeking and retrieval fundamentally is pragmatic in nature, we are able to address the dynamical nature of information seeking activity - that knowledge structures are flexible and accommodative, and that user's interaction with an information system essentially is a communicative process of clarification.

Consequently, in order to make our conception of information need intelligible, circumventing the fallacy of the information seeking paradox, we must base our thinking about information need in the premise that it is possible to know that something is unknown, and that it is possible to make inquiries into the status and nature of what is unknown, and ultimately to make inquiries about what is unknown, test hypothesis and different ideas and model for explication and in the end select the best possible explanation, that follows the path of reasoning based on clear premises.

The paper subsequently discusses the concept of information need through the following premises:

Premise 1: Only minds has information needs

Premise 2: Information needs arise in relation to work tasks

Premise 3: The fulfillment of information needs is relative to a universe of discourse and collateral experience

Premise 4: The development of an information need develops from an emotional state through information to knowledge.

What is an information need – and how does it emerge?

The concept of information need has been widely discussed within the literature of LIS, especially in research related to information retrieval (IR) (Bates, 2002, Borlund and Ingwersen, 1997, Dervin and Nilan, 1986, Ingwersen, 1996, Belkin et al., 1982, Kuhlthau, 1991, Kuhlthau, 2004).

However, as I will demonstrate the concept of information need may profit from an analysis based in pragmatic thinking and semiotic analysis.

Peircean semeiotic constitutes a theory of reasoning (critic), and Peirce's pragmatic maxime constitutes a mode of inquiry (methodeutic), (CP 2.191). "*But pragmatism does not undertake to say in what the meanings of all signs consist, but merely to lay down a method of determining the meanings of intellectual concepts, that is, of those upon which reasonings may turn.*"(CP 5.8)

It is important at this point to point out that for Peirce the pragmatic maxime is a general method for ascertaining the meaning and truth of an intellectual conception by considering its conceivable

consequences, that which may follow logically from the conception. Furthermore, for Peirce, the Pragmatic maxime is connected to his concept of truth, where truth is that upon which reasoning in the long run may turn.

Ad P1) Peirce's pragmatic maxime thus implicate a telos, a direction of reasoning, and is consequently concerned with consequences rather than solutions.

Following Peirce line of thought, the concept of information need, relate to reasoning. An information need arise on account of a problem situation or a phenomenon that cannot be explained by means of current knowledge, therefore sources of information is consulted in order to provide for a satisfying answer. The awareness of the insufficiency of current knowledge is itself pragmatic in nature, because, reasoning about what is known, clarifying what is unknown is itself on the path of future enquiry.

The information need, in order to be more than an anomalous state of knowledge, must be transformed into reasonable lines of consequences that demands further investigations, in order to provide for the best and most reasonable answer given the beforehand knowledge. The information need itself, however, is also an emotional effect that is motivated by the particular situation. Consequently, information need relate to mind, and information to matter.

Ad P2) an information need arise in relation to a work task, a problem situation, a hypothesis or some kind of curiosity. The information need of a scientist arises based on research, where the ability to explain phenomena by means of acknowledged theories following accepted methods and ethics of research is critical. Other kinds of information need may arise based in everyday conduct, thus seeking ad hoc information, or facts. Consequently, we should distinguish between information needs that are attentive to known facts, objects, phenomena, etc. and information needs that enquire into the unknown.

Ad P3) the universe of discourse is defined as the socially framed or situated context wherein the information seeking activity takes place. The user's problem space or work task situation is anchored in a certain context that provides meaning, scope and purpose to the information seeking behavior. Deliberate information seeking is never random but, as argued above, purposeful and goal directed. Understanding the context of deliberate reasoning that gives rise to the formulation of a particular information need is thus imperative.

Peircean pragmatism, place the concept of information need as something internal to a mind, that is triggered by the external world.

Figure 1 provides for a semiotic model of communication. The concept of significance-effect is considered an effect of meaning, which is relative to collateral experience and a universe of discourse. Consequently, the meaning of a sign, e.g an observation of a phenomenon, an incident, or even an idea, is relative to what is already known by the percieving mind, and to a universe of discourse. Originally, the model was as considered a communication model of separate entities, the utterer: a mind or quasi mind; and the interpreter. However the model may also illustrate selfreflection. An idea or a hypothesis may as well be considered an intentional interpretant, and the significance-effect thus depends on the known premisises of the hypothesis, following the lines of deliberate reasoning (induction, deduction, abduction). Consequently, the concept of information need may be considered a particular kind of significance-effect.

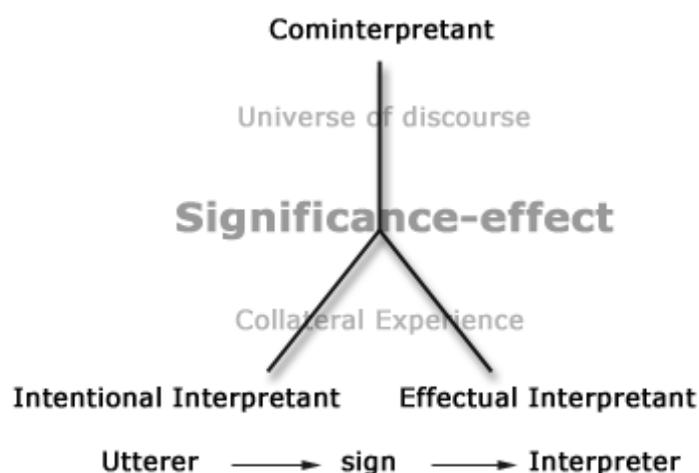


Figure 1. The Dynacom model (Thellefsen et al., 2011, Thellefsen et al., 2006)

Figure 2 exemplifies the model by an example: A Bach scholar searches a bibliographic database for a particular score by Johan Sebastian Bach (the information needed). This score is important to him since he needs it to be able to prove a scientific point. He is used to searching the particular database and he is capable of identifying the relevant findings. He makes the search using the search phrase "*j.s bach & suites for harpsichord*". This results in – lets say – 100 relevant matches where of two are highly relevant. Let us try to analyse this example using the dynacom.

The Bach scholar writes a query, this makes him the utterer; he endows the query with an intentional interpretant. The system receives the query and react upon the query, this makes the system a quasi-interpretant; it is effected by the intention of the query and therefore represents an effectual interpretant. But it is quasi, since the system is not able to react in other ways than it is programmed to but still it is an interpreter since it translates the query in to a given search result. The real interpreter is the Bach scholar since he uses the user interface as a medium in his dialog. So the Bach scholar is both the utterer and the interpreter. This seems analog to someone writing on a piece of paper, this is also a dialog between the writer and his future self but in this case he has more control over what he writes, his thoughts are more identifical to his writings on the paper. The difference between the writing on the computer and the writing on the paper is that the paper do not transform the written word (e.g. by means of search algorithms that may provide for best match ranking) in a way hidden to the writer, whereas the text written in the query field definitely is altered when processed by the computer, hence, the meaning becomes altered. This is also the case when communicating to another person or a group of persons. The utterance embedded with a certain intentionality may be completely misinterpreted by the interpreter. The more collateral experience shared between the utterer and the interpreter the greater the chance is for a correct interpretation (the cominterpretant).

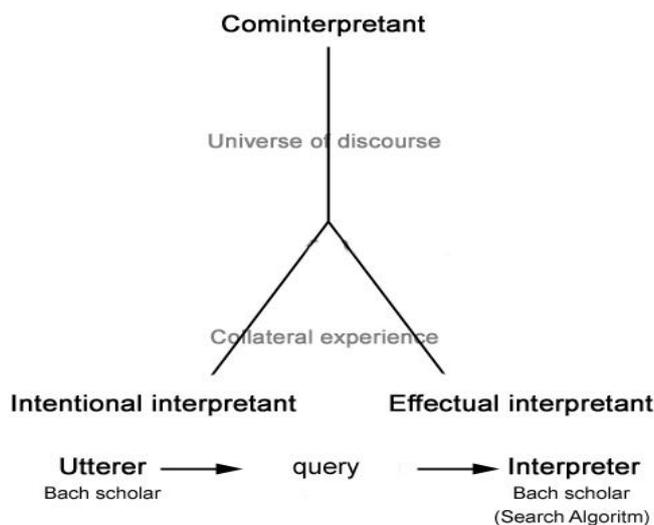


Figure 2. exemplifying information need using the Dynacom model

In the case with the Bach scholar it is a dialog between himself and his future self mediated by the interface of the bibliographic database, but when he sends the query, he loses control of it; he does not know how his query is being processed. However, this may occur to him when he gets the result of the search, which causes an effectual interpretant in the utterer. In order for the Bach scholar to have a successful experience, the database must return documents that matches his information need. But the assessment of relevance of documents is of course based on the amount of collateral experience the Bach scholar possesses about his information need. The more collateral knowledge the Bach scholar possesses about his information need, the more likely will he be capable of determining the relevance of the search result.

Ad P4) in premises above concept of information need is considered a meaning creation process based in a pragmatic and semeiotic perspective. Such a perspective does not necessarily entail a subject. According to Peirce, the universe is perfused with signs (cf. CP: 5.448, n1). Nor does it necessarily entail intentionality. However, communication between human agents, and even selfreflection involves intentionality - therefore, emotion, information and cognition in the context of communication are integral parts of the dynacom.

The emotional sign	The informational sign	The cognitional sign
The emotional sign is made up from qualisign, sinsign and legisign.	The informational sign is made up from icon, index and symbol.	The cognitional sign is made up from rheme, dicent sign and argument.
The emotional sign is real and internal.	The informational sign is real and external.	The cognitional sign is real and makes the relation between the internal world and external ditto intelligible
The emotional sign is what it is in itself and by itself – it is a sign qua sign.	The informational sign is a relation between two, namely a dynamical object and a representamen.	The cognitional sign is a relation between three elements representamen, object and interpretant

Table 1. The three kinds of signs related to emotion, information and cognition

Three elements seem to make up the meaning creation process: emotion, information and cognition. They seem to be understandable within Peirce's framework of consciousness consisting of primisense (emotion), altersense (information) and cognition (medisense) and semeiotics involving three sign trichotomies. Consequently, the bringing of sub-consciousness to self-consciousness is similar to the process of meaning creation or semeiosis. Or we can say that the process of meaning creation begins with feeling and emotion and passes through experience of the world (the imagined or the physical world), and then enters into thought and concepts – the process being underlined by a degree of collateral experience.

Concluding thoughts

Information science, in particular the fields concerned with organization and retrieval of information, struggle with a fragmented view of the information processes connected to the areas of the information system itself, the human agents interacting with the system and the community that frames information behavior of the individual users.

The pragmatic and semeiotic line of thought, however, is not a bird's eye and neutral perspective. It is, rather, as formulated in this particular context, a method for reasoning about the information processes connected to the information system, the conduct of human agents and the community.

We have demonstrated that the pragmatic and semeiotic view takes into account that signs are signs of meaning; that users interpret signs, and use signs in their information seeking activity, simply because the signs carries meaning to the user. However, the meaning of signs and the ability of users to interpret the signs is relative to the individual level of collateral experience.

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