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Thomas Lauer
Oakland University

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Questions and Information: Contrasting Metaphors

Thomas W. Lauer, Oakland University, lauer@oakland.edu

Introduction

The denotation of the current era as the 'Information Age' has emphasized the primacy of information and its relatives, data and knowledge, to modern society. How do people conceptualize information? The emergence of new information related fields and the pervasiveness of information issues in society suggest that for information and related phenomena, there is some conceptual coherence, what might be called an information paradigm.

Its buzzword status notwithstanding, the word paradigm has a rich meaning when referring to the scientific study of a set of related phenomena. A paradigm is a pattern, exemplar, or model that provides a coherent mental organization for some complex set of phenomena. According to Thomas Kuhn (Kuhn 1979), different metaphors, used for explaining basic concepts are included within a particular scientific paradigm. He states, "Metaphor plays an essential role in establishing links between scientific language and the world. Those links are not given once and for all. Theory change, in particular, is accompanied by a change in some of the relevant metaphors and in the corresponding parts of the network of similarities through which terms attach to nature."

An information paradigm, at a minimum, would be concerned with descriptions of information creation, discovery, transformation, maintenance, usage, and the relationships among data, information, and knowledge. Coherent patterns in the use of metaphors related to information and its uses would provide a means for describing an information paradigm. Likewise, proposing an alternative paradigm would involve the use of different metaphors for describing the same domain.

In contrast to the newness of the study of information, questions and question asking are ancient phenomena. However, there is a complementary relationship between questions and information. According to MacKay (1969), a theory of information should start with a theory of questions. This is so because if one starts with an indicative statement, it is meaningless unless one knows the question that it answers. Therefore, the question implies a set of goals and perhaps a context. The pragmatic dimension of the question, whether the question is voiced or implicit, is linked to the meaning of the indicative statement. Because of the relationship between questions and information, it should be possible to study many issues, either from the standpoint of

information or from the standpoint of questions and question asking.

However, studying questions is difficult because asking questions is so basic to what we do as human beings. We learned to ask questions as toddlers, but over time, our question asking becomes more internal and less conscious. For most people, question asking becomes a form of tacit knowledge.

This paper argues that the complementary perspective of question asking enhances the information centric view that characterizes the MIS field. The two perspectives are contrasted by examining metaphors for information and metaphors for questions. Based on analyzing features of the contrasting metaphors, the paper asserts that an emphasis on inquiry gives a better balance and provides new insights for a number of basic issues in MIS that pertain to information need and usage.

The complementary relationship between questions and information

Questions can be identified by their syntactic features, a question mark at the end of a written sentence, or a rising intonation at the end of an utterance. Questions may fulfill different pragmatic goals including information seeking, complaining, requesting, making a rhetorical comment (Graesser and Murachver 1985). People may also generate questions out of a desire to remedy a knowledge deficit, to monitor common ground, for the social coordination of action, or to control a conversation or attract attention (Graesser, Person, and Huber 1991). It is questions that seek information to remediate a knowledge deficit that have an inseparable complementary relationship with information. Questions that have a pragmatic goal other than information seeking are beyond the scope of this article.

Hintikka argues strongly for the relationship between questions and information in many of his writings. He claims that the best way to understand what is normally considered to be deduction or inference is as answers to tacit questions (Hintikka 1983). Deduction by itself does less than people need to solve problems. A purely deductive approach assumes that all the relevant information is given and is thus tautological (Wittgenstein 1961). For non-trivial problems, there is a need to search beyond what is given for information that will be relevant to the solution. How is that additional information made available to the problem solver? It is through asking and answering questions. The skill of someone who is an expert at applied reasoning is the strategic ability to

choose which questions to ask (Hintikka 1983). Information that is not originally provided can be brought into the problem space by activating tacit knowledge or by observation. Questions are useful for both. Even perception, the most elementary form of observation can be conceptualized as an answer to a question (Hintikka and Hintikka 1983; Gibson 1966).

Metaphors for information

Why should metaphors for information be pervasive and important? Contemporary theory of metaphor (Lakoff & Johnson 1980; Lakoff 1993) holds that metaphors are not mere figures of speech. Rather, they are conceptual mappings from one domain to another. Metaphors are commonly used to describe abstract concepts that are less amenable to crisp definitions. Concepts such as love, time, and an argument are often expressed metaphorically. Information is the sort of concept that lends itself to metaphorical expression.

One of the earliest systematic analyses of metaphors was a study of communication that yielded the “conduit metaphor” (Reddy 1979). Although the conduit metaphor is a metaphor for communication, its assumptions about the locus and transmission of meaning are germane to a discussion of information metaphors. The essential features of the conduit metaphor are: a) ideas (meaning, information) are objects, b) linguistic forms are containers (for ideas), and c) communication is sending. When person1 communicates (speaks, writes) to person2, person1 *puts ideas into words and conveys them* to person2. Person2 then *extracts the meaning from the message*. Reddy found that in English, the use of this metaphor is nearly pervasive in language that describes communication. He also shows how the use of the conduit metaphor distorts several of our notions about communication leading us to expect trouble free communication with little effort. As he shows, communication failure is generally attributed to (blamed on) the other party.

The expression *information is a resource* is a metaphor that retains some essential features of the conduit metaphor, namely the objectification of information and its suitability for processing into a form amenable to transmission. The domain, information, is understood in terms of another domain, resources. Resources have the following characteristics. They have intrinsic value, but may require some processing to realize that value. They may be used as an energy source to achieve some outcome. On a societal level, specialists may extract the resources from nature, refine them, and provide them to individual consumers. Metaphors of the *information is a resource* type will map some or all of the characteristics from the resource domain to the information domain.

One example of this metaphor is Newell & Simon’s theory of humans as information processors (Newell & Simon 1972). Humans act as information processing systems that use information as a resource for decision making. A more vivid use of this metaphor is found in Davenport (1997) where he discusses the flow of information to an information consumer. Information is described as water, necessary for sustaining life in an information environment. Davenport urges us to “...learn how to manage information flow before it becomes an information flood.” A third example from the knowledge management area states that we can find “nuggets of knowledge” through mining raw data (Fayyad et al. 1996). A related example is the notion of “drilling down” to different levels of information in an executive information system. These evoke the notion of drilling for oil or some precious ore that will subsequently be used for energy to fuel decision making or to fabricate some valuable information product.

These metaphors for information retain the assumption that information is an object that can be manipulated in some manner and then transmitted. The majority of effort goes into the production of information with the assumption that usage (understanding) is trivial. When the results fall below expectations, there follows reciprocal blaming between producers and users of the information.

Metaphors for questions

Metaphors for questions are less common. This may be due to the tacit nature of question asking or as Roger Schank (1988) suggests, for a society in a hurry, answers are more important than questions. The root of question is related to the word for seeking. This sense is found in the Chinese character for asking which includes the character for door or gate. Asking a question requires an active search for an answer or the source of an answer.

Here are some additional metaphors for questions. A good question is an irritant, like the grain of sand for the oyster. In this case the shell is a metaphor for closed mind and the grain of sand forces it to open. The good question may produce a pearl. A related metaphor is that questions are the enemies of authority. Such questions are challenging, especially in a world where conformity is required and ambiguity is shunned. A question can invite a new perspective and cast doubt upon previous assumptions.

Another analogy for inquiry illustrates how an initial question can set in motion an inquiry process. According to Robert Louis Stevenson, “You start a question and it’s like starting a stone. You sit quietly on top of a hill, and away the stone goes, starting others.” Others have noted a cascading series of connected questions. Hintikka conceives of logical inference as a

game in which the information in the premises is augmented by asking questions. There is a natural hierarchy of questions where the superordinate question sets up the goal of the inquiry. Subordinate questions seek part of the information needed to answer the overarching question. Once the superordinate question is established, it can set in motion a series of related questions. Those questions can be further broken down into a set of smaller questions, and so on. Similarly, Graesser et al. have identified question sequences associated with particular knowledge structures appropriate for accomplishing various goals such as identifying causal structures, taxonomic structures, and goal hierarchies.

Metaphors for questions emphasize the active search for information. They stress flexibility, a tolerance for ambiguity, and the dynamic processes necessary for developing understanding.

Conclusion

What could a question centric viewpoint offer the MIS world? Table 1 offers some assertions about differences between an information centric approach and a question centric approach. The Chinese ideogram for knowledge includes both the character for asking and the character for learning. Effective inquiry does not occur in an information vacuum. Knowledge comes about in information and learning rich environments when good questions are asked. However, the question is essential. Without doing the work of asking good questions, the user of information will not appreciate its significance. A question centric approach clearly ties the information made available to anticipated usage where usage can be modeled in the form of questions.

Table 1
Contrasting Characteristics of Information and Questions

| | Information Centric | Question Centric |
|-------------------------|-------------------------------|--|
| Locus of responsibility | With the information provider | Shared between the information provider and questioner |
| Communication style | Conduit | Negotiated |
| Perceived difficulty | Something for nothing | Appreciation of the difficulty of finding a good answer |
| Usage (understanding) | Passive | Active |
| Locus of creativity | With the information provider | Shared between the information provider and the questioner |
| Tolerance for ambiguity | Low | High |
| Static vs. dynamic | Information is static | Questions are dynamic |

References available on request