A Semiosis Model of the Natures and Relationships among Categories of Information in IS

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ABSTRACT

The paper explores, in a semiotics approach, the natures and the relationships between the category of information and its relatives that are data and knowledge. The resultant process model makes clear both the evolutionary natures and the triadic relation among the information categories. In addition, drawn on Peirce’s theory of inquiry which stresses the role of community along the inquiring process, a central thesis of the paper is the pragmatic model of information formulation in the information systems field.

Keywords: Information, Information Systems, Inquiry, Management Consultancy, Semiotics, Systems Thinking

INTRODUCTION

The notion of ‘information’ is so ubiquitous that it is one of the most key terms of various disciplines (McKinney & Yoos, 2010). For the field of information systems (IS), the concept of information is of great importance (Lauer, 2001), which leads to the question about the nature of information as well as the distinction between information and its typical relatives such as data and knowledge (Checkland & Holwell, 1998). Mingers (2006, p.104) observed that ... there is little agreement within the IS discipline over the nature of information itself.

More, the question of information leads quite naturally into a consideration of knowledge” for example, whether or not knowledge is different from information or wider than just information (p.6).

The relationships among data, information and knowledge are usually explored in the context of hierarchical ladders of information categories (e.g. Ackoff, 1989). Although the hierarchies play the role of a central model in not only IS, but also information management (IM), knowledge management (KM) (Rowley, 2007), and even management science (Mingers, 2006), these relationships are often misunderstood or confused (Tuomi, 1999), or have limited discussions about themselves.

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Numerous efforts have been made to distinguish among data, information and knowledge (Alavi & Leidner, 2001), but there may be no clear consensus on the distinction, for example, between data and information (Checkland & Holwell, 1998), between information and knowledge (Rowley, 2007), or among information, knowledge, and data (Mingers, 2008).

In the light of the Peircean theory of inquiry, this paper proposes a semiosis model of information. The model brings the notions of data, information, and knowledge into a dynamic triadic relation of the Peircean generic categories that are Firstness, Secondness, and Thirdness. The triadic relation cannot be reducible into dyadic relations between pairs of categories, and moreover, any category (e.g. information), can be irreducible into the other categories (e.g. data or knowledge). The categories are transformed into each other in the evolutionary process of human inquiry and intervention of the real world, in which history matters. Hence, we argue that there are three and only three states or categories of information, which are data, knowledge and information itself, and thus, varieties of knowledge or information (e.g. subjective knowledge, objective information) are no longer relevant. The three-fold nature of information helps to address the long-standing theoretical debates of nature of information and knowledge (e.g. Mingers, 2008).

Implicitly, the semiosis model of information also sets forth a key stone or kernel for theories of information in IS. Indeed, in Popper’s (1972, p.310) words:

*One should never ... get involved in question of terminology ... What we are really interested in, our real problems, ... are problems of theories and their truth.*

This is that, more indirectly but no less importantly, the multi-faceted nature and relationships among information categories constitute a conceptual framework for information as a unity of three components (data, knowledge, and information itself) as well as of three sorts of corresponding relationships (human experience or intervention, insight or intuition, and inference or logic), or a unity of object (data, knowledge or information), process (creation and use or exploration and exploitation) and locus (individual or collective). Our point of departure is two fold: knowledge (and data) is the prerequisite, and information is the outcome of the evolutionary process cycling among data, knowledge and information. The former comes from the popular resource-based or knowledge based view in management literature (e.g. Grant, 2002) and the latter results from some pragmatic views in IS such as information system as a pragmatic model (Checkland & Holwell, 1998), or teleological nature of information system (Churchman, 1971).

The paper is structured as follows. First, we revisit the relationships among data, information and knowledge by exploring kinds of hierarchy of these categories. Then, we suggest a process model of information formulation based on the Peircean semiotics. An illustrative case study is presented next. Finally, we conclude with the discussions, and implications of the resultant semiosis.

**REVISITING RELATIONSHIPS AMONG DATA, INFORMATION AND KNOWLEDGE**

First we review the cognitive sciences which is a major reference discipline of IS (Hevner, March, Park & Ram, 2004). Information is often investigated in a series of relevant phenomena that could be symbol and meaning (Mingers, 2006), data (Davenport & Prusak, 1998), information (Metcalfe & Powell, 1995), knowing, explicit knowledge and tacit knowledge (Polanyi, 1962), decision (Simon, 1997), individual, group, organizational and inter-organizational knowledge (Nonaka, 1994), esoteric and exoteric knowledge (Churchman, 1971), understanding and wisdom (Ackoff, 1989), rational action (Ulrich, 2001) and so on. Nevertheless, it is also widely recognized that both the relationships among data, information...
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