

Information Need and the Beginning of Information Search



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INTRODUCTION

Information need is the start state that motivates an individual to commence information search. Information search is direct human to information system interaction where the individual is purposefully setting out to conduct an information search—with an explicit purpose for finding information. Search engines such as Google, Yahoo or Bing are information systems, but there are also reference or scholarly information systems such as PsycINFO or PubMed. We now conduct information search on various devices, including mobile phones and tablets. Information search has become a signature activity of our Information Age.

The problem is that with the present conception of information need that underlies information search system design, information systems only do one type of information search well, called a command search (where we know the form of the answer before we start the search). As we shall see, an individual requires a certain amount of knowledge to successfully formulate such a search. Especially among disadvantaged groups in society, information exploration to formulate a new idea, or in the case of students researching a new topic for a school assignment or writing an essay, this type of exploratory search is not well served by present information systems. The investigation and specification of the concept of information need as a door to creating truly effective information search systems is the focus of this article.

BACKGROUND

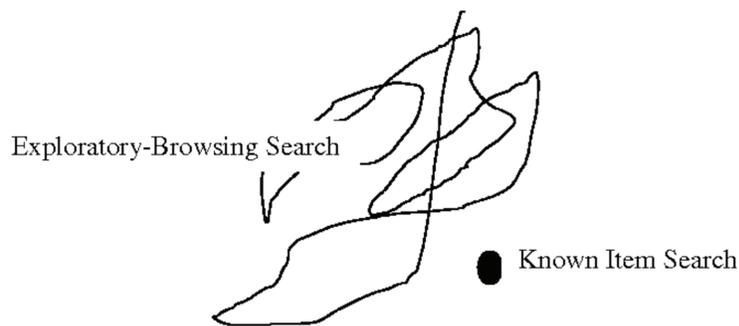
Information need has long been a primary sub-topic in the information science subject area of information seeking, needs and uses research, which includes user studies. The first studies of this type occurred in the

1940s; according to Wilson (1994; 2010), the first usage of “need” occurred in 1958 at the International Conference on Scientific Information (1959) under the subject term “Literature and Reference Needs of Scientists: Knowledge now available and methods of ascertaining requirements.” In the 1960s-70s (Menzel, 1966), there were annual chapters on information need in the Annual Review of Information Science and Technology (ARIST). The last two ARIST chapters were Dervin and Nilan (1986) and Hewins (1990). In the 1990s, information need was subsumed under the rubric, information seeking, with either a sociological emphasis (e.g., Allen, 1996), or a cognitive approach (e.g., Ingwersen & Järvelin, 2005). Since 2000, information needs research has been subsumed under the rubric, human information behavior (since Wilson, 1999; see also, Case, 2012; Ellis, 2011; Fisher, Erdelez & McKechnie, 2005). Cole (2012) is a recent attempt to refocus information science research on information need.

The apogee of the need concept was Taylor’s (1968) four level model of information need, developed for question negotiating at the library reference desk. Users come to the reference desk with a real information need, which Taylor called Level Q1, but it is unconscious, visceral and unspecifiable even to the user herself. The exceptional idea that Taylor conceptualized in his information need model was that users articulated their need to an information system—the card catalogue/classification scheme or librarian—at Level Q4, which was a compromised form of their real information need. Taylor called Level Q4 the command level of the user’s information need, while Levels Q1-Q3 were the question levels. In Level Q4, the user commands or requests from the information system a specific item or a specific form of answer. “In response to his command,” writes Taylor (1968), “the inquirer is delivered, or he locates, a specific package.”

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Figure 1. The user's mental representation of an exploratory-browsing search vs. a known item or form-of-answer search



The difference between the command and question levels is highly important. The intent of a command from the user, according to Mackay (2012), is to affect the “goal-setting” levers in the information system, while the intent of a question from the user is for the system to affect the goal-settings in the user—i.e., to make the user more ready to receive new information (see also, Nicolaisen, 2009). Typically, a user who conducts a search for a known item (e.g., the price of plane ticket to Paris) is issuing a command for an answer to the information system while a user who issues a question to the system (e.g., Where should I travel this year?) is conducting an exploratory or browsing search (Cole, Julien & Leide, 2010). We contrast the user's mental representation of an exploratory-browsing versus a known item (or form of answer) search in Figure 1.

After Taylor (1968), the next seminal article in information need was Wilson (1981). Wilson (1981) states that information need is a secondary need dependent on the primary cognitive, affective and physical human needs (see also the hierarchy of human needs described by Maslow, 1943). For instance, the individual needs information in a problematic situation (Wersig & Windel, 1985; Belkin & Vickery, 1985), which presents a cognitive, affective or physical conundrum the individual must solve or get out of.

The optic that information need is a secondary not a primary human need caused a revolution in information science. From then on, the contextual information seeking situation of the individual was studied as the reason for and shaping of the individual's need for information, which constantly evolves as the individual picks up information (Bates, 1989), and thinks about it as the individual is constantly trying to make

sense of existence (Dervin, 2003). More specifically, an individual's information need evolves over the course of performing a task (Vakkari, 2001)—e.g., the information need evolves over the six stages of researching a school assignment (Kuhlthau, 1993), or over the four stages of identifying and solving a problem (Wilson, 1999).

Since 2000, evolutionary psychology has been used by certain information scientists to present another optic on information need (Bates, 2005; Spink, 2010); this new optic brings information need into a central position as one of the primary human needs (Cole, 2011). According to this optic, the brain of the human species has, through evolutionary forces, adapted and acquired an environmental and societal information monitoring system that (1) alerts us to new information in the environment, and (2) enables us to process this new information into knowledge to ensure our continued survival as a species. Our cognitive system's framework for processing new information into knowledge has an existential component—i.e., the meaning of our place in the world. In Figure 2's depiction of our theory of information need (Cole, 2011; 2013), we visualize as a tunnel that every exploratory information search act is partly driven by this deepest, existential level of information need.

Figure 2 shows there are vertical and horizontal dimensions to information need. Shown vertically is Taylor's four level model of information need, from Q4 at the top of the “V” to Q1 at the bottom. Shown horizontally, Kuhlthau's (1993; 2004) well known 6-stage Information Search Process (ISP) Model provides the evolution of information need from start to finish of a student's school assignment. We simplify

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