

Information Encountering: A Conceptual Framework for Accidental Information Discovery

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INTRODUCTION

The complex nature of human information behavior is only partially explained by the frameworks that emphasize active, specific, and direct searching for information. Information seeking *is* a crucial method of acquiring information, however, people also find information when they are not seeking any, or are not involved in looking for the particular information that they happen to find. For example, library research for a term paper, a conversation overheard on the subway, or an article left at the copy machine may provide unexpected but useful information that was not sought. Such memorable experiences of accidental discovery of useful or interesting information are in this paper called *information encountering*.

The most notable examples of information encountering are documented in the context of accidental scientific or technological discoveries, such as discovery of X-rays, and discovery of "Post-it" notes. (Robert, 1989; Shapiro 1986; Austin 1978) The two recent studies on users' information behavior by Zhang (1992) and Reneker (1992) also recognized that information encountering is an omnipresent method of information acquisition experienced in information behavior in academic environments. However, besides these initial studies, information science research has not yet sufficiently identified and explored information encountering as a unique element of information behavior. Because our understanding of information encountering, as a type of information acquisition, is scattered and very limited, a study was performed to explore the characteristics of information encountering and its role within the overall framework of users' information behavior.

BACKGROUND

There is no formal definition of what constitutes information behavior. Within the context of this study information behavior was seen as an all-encompassing term that involves various forms of users' conceptual and physical contacts with

information. For example, the elements of information behavior are: users' information needs, information acquisition, organization, use, dissemination, etc. Information behavior not only involves users' observable actions, but also users' thoughts and feelings.

In the information science literature, information behavior is primarily perceived in the context of active, problem-driven pursuit of information. For example, the Anomalous State of Knowledge (ASK) hypothesis suggests that problems make users realize that their states of knowledge are inadequate, and that users' needs to collect information arise from a need to improve their knowledge about the problem. (Belkin et al. 1982) The literature also suggests that information seeking is a goal-driven activity (Brown 1991), that it is governed by users' problems or task requirements (Mick et al. 1980), and that it is a part of a broader process of active decision making, problem solving, or resource allocation. (Rouse & Rouse 1984)

Some early user studies, however, recognized that users approach information with different strategies. For example, in an early study on information behavior of scientists, Voigt (1961) identified current, everyday, and exhaustive approaches to information, each with different information-seeking strategies. There is also an understanding that users' information behavior may have different levels of focus or problem specificity. Childers (1975) explained how kinetic and potential needs relate to problem-specific and non-problem specific information seeking. Likewise, Kirkelas (1983) differentiated between problem-specific and non-problem-specific information gathering. Some other information science authors also question whether information-seeking really has a clear purpose (Rouse & Rouse 1984), whether it is a rational intellectual activity (Roberts 1982), and suggested that in many contexts it may be better presented by a "berrypicking/evolving model" than by the classic, linear information retrieval model. Bates (1989) However, despite an awareness that not all information behavior is focused and problem specific, there is still insufficient empirical research about information behavior that involves alternative types of information acquisition.

Two types of information acquisition are in the literature commonly associated with non-focused, and not-problem-specific information behavior: browsing and environmental scanning. Historically, information and library science researchers have addressed *browsing* as a form of semi-directed or semi-structured information-seeking, (Ellis 1989) that is often pejoratively described as "don't-know-what-I-want behavior" (Bates 1989). Recently, however, the review by Chang and Rice (1993) identified "browsing as a rich and fundamental human information behavior" (p. 263) that is crucial for a complete understanding of information seeking. The typologies of browsing provided in the literature suggest that it can be directed and specific, but also casual and unsystematic. Browsing that is identified as directed (Herner 1970), systematic

(Beheshti 1992), semi-deterministic (Levine 1969), discriminatory (Vickery 1977), or specific (Apted 1971) is in many ways similar to information-seeking. It assumes that users have a specific intent or aim to get information, but no knowledge about how to get it. (Herner 1970) Another type of browsing is described as undirected (Herner 1970), random (Levine 1969; Beheshti 1992), and recreational. (Vickery 1977) Its main characteristic is that it is casual and unsystematic; users do not have definite goals, and their success is serendipitous.

Environmental scanning is a type of information acquisition that involves various information activities performed commonly by business managers in order to keep abreast of developments in their business environments. Francis Aguilar in his seminal book *Scanning the Business Environment*, (1967) recognized that environmental scanning may involve different modes of information exposure and perception, ranging from deliberate to accidental information gathering. Deliberate environmental scanning could be performed as an informal or formal search. Less directed modes of environmental scanning are *conditioned viewing* and *undirected viewing* that involve direct or general exposure to information. According to Aguilar, *undirected viewing* is the least deliberate mode of environmental scanning and it provides the opportunities for accidental information gathering. Users are generally exposed to information, but there is no specific purpose, only a desire to explore.

In summary, the analysis of typologies of browsing and environmental scanning suggests that information encountering is already identified as a distinctive type of information acquisition which occurs within random browsing and environmental scanning (undirected viewing). However, mainly because of the information science emphasis on directed and focused information seeking, little is known about information encountering itself, and how it relates to users' information behavior.

METHODOLOGY

The study used an exploratory research design to address a research topic that is new and not well researched. Data on information-encountering experiences were collected from a sample of students and employees in an academic setting. The study data consisted of users' recollections of their specific information-encountering situations and users' perceptions of their overall information-encountering experiences.

Data were collected by the application of two qualitative data collection methods: a survey and in-depth interviewing. The *survey* provided data on individual information-encountering experiences and involved primarily open-ended questions to ensure the preservation of original users' expressions of information encountering. The survey questionnaires were self-administered in group settings and completed by 132 respondents. The method of *in-depth interviewing* provided a rich study data that was necessary because of the

exploratory nature of the research. The interviews were conducted with 12 respondents selected from the pool of study participants who reported having frequent information-encountering experiences. The interviews took the form of a general interview guide that provided a systematic and comprehensive approach to the interviewing process.

Study data were transcribed and then coded and analyzed in several iterations. The analysis was performed with a faceted classification framework that was developed inductively from the study data. The primary method of analysis was content analysis.

SUMMARY OF FINDINGS

The characteristics of information encountering were systematically explored according to the conceptual model that addressed four dimensions of the encounter:

- the individual who encountered information (information user);
- the environment in which information was encountered;
- the information that was encountered; and
- the information need addressed with information that was encountered.

The *user dimension* encompassed behavioral, cognitive, and affective elements of the information encounter, as experienced by individual users. The study findings suggested that users' activities performed immediately before information encountering could be categorized into information related activities (usually considered to be "information behavior") and non-information related activities.

Cognitive and affective aspects of the user dimension (thoughts and feelings experienced by respondents) were analyzed and compared for the time immediately before and immediately after the event of information encountering. Most evident was the change from negative feelings (e.g., frustration, boredom, anxiousness) before encountering, to positive feelings after encountering (e.g., excitement, happiness, interest). There was also a change in the types of thoughts experienced by respondents – primarily from non-information-behavior related thoughts before encountering to information behavior-related thoughts after encountering.

For the environment dimension, the study found that respondents often encountered information when in physical environments that specifically provide information services such as libraries and seminars, but also in environments where provision of information service was not the primary function. Also, respondents were able to articulate preference for the type of environments they found conducive for information encountering.

In the context of information dimension, the study found that information encountered by respondents can be described as "problem-related" or as "inter-

est-related". Problem-related information was useful and applicable to some identifiable problem area. Respondents had often sought that information before or had a plan to do so. Interest-related information addressed some area of general interest or concern, its usefulness was vague or described as potential, and respondents did not have prior seeking experience related to that information.

Another issue addressed within the information dimension was what happened with the information since it was encountered, especially, if and how that information was "applied". Less than 20% of information encountered by the study respondents had not been used since the time it was encountered. The information that was reported as used had been applied in some specific action or accomplishment (e.g., to complete a paper, to buy a book) or to address some more general need (e.g., for "expansion of knowledge"). Interestingly, a number of respondents also stated that their "use" of information involved sharing it with other interested individuals or some "information management" activity (e.g., filing, saving, or recording information for future use).

The analysis of information need dimension of information encountered suggested that information encountered related to needs with different currency. The majority of needs were "present" – the type of needs that were on respondents' "to-do" list, but were not pursued at the time of information encountering. Only several information encountering experiences addressing future information needs were reported (i.e., needs that respondents planned to attend to in some specific time in the future). Finally, the study sample did not provide situations with past information needs (i.e., those needs that were current some time in the past).

The study also addressed the relationship between information encountering and respondents overall information behavior, especially from the perspective of respondents' information acquisition and their information needs. The study's findings indicated that information encountering was an integral element of browsing and information-seeking activities performed by the study respondents. The interviews revealed that information encountering brought satisfaction to respondents' browsing activities, and that in turn further reinforced their browsing habits. Also, when information encountering occurred within the context of information seeking it appeared to change the "mono-dimensionality" of respondents search behavior. Through the events of information encountering the respondents were "shifted" to other dimensions of their information needs, e.g., different time-frames, parallel problem and subject areas. Several interview respondents specifically stated that information encountering enabled them to see their information needs from a different perspective.

INTERPRETATION OF FINDINGS

The study findings supported the expectation that many people commonly experience information encountering. However, from the comments provided by the survey respondents and from the follow-up interviews, it emerged that respondents had different perceptions of their information-encountering experiences. According to these perceptions four tentative groups of respondents could be created:

1. *Super-encounterers* – respondents who very often experienced information encountering, who relied on it, and considered it as an integral element of their information behavior;
2. *Encounterers* – respondents who often experienced information encountering, who were aware of the chain of coincidental situations, but did not perceive how these connected to their information behavior;
3. *Occasional encounterers* – respondents who stated that they occasionally encountered information, and perceived it merely as a lucky incident; and
4. *Nonencounterers* – respondents who stated that they very seldom encountered information. This group may potentially include a few respondents who declined to complete the survey.

The presence of the super-encounterers was an especially interesting finding of this study. These respondents appeared to share a common excitement for information encountering. They believed in creating situations conducive to information encountering and in that way finding useful and important information. A common characteristic of super-encounterers that emerged during the interviews was that they were excited to share their rich encountering experiences with a researcher. Little or no probing was needed to conduct the interviews. A factor that seemed to be crucial for super-encounterers was positive reinforcement. This reinforcement came as a result of many successful information-encountering experiences, especially the "most memorable" ones.

It also could be speculated that a combination of psychological profiles and personal traits of the super-encounterers enhanced their chances of information encountering, making them "serendipity-prone." (Merton 1958) The types of personal characteristics self-reported by respondents included curiosity and desire for exploration, interest in different hobbies and various subject areas.

Besides providing better understanding about the characteristics of people who often encounter information and specific situations in which information is encountered, this study also supported and built on the existing frameworks of users' information behavior. For example, the findings on the characteristics of the *problem* dimension of information encountering revealed that information encountering enabled respondents to function in different time dimensions, i.e., present, past, and future problems or information needs. The notion of movement and process, in connection to users' problems and information needs,

is not a new one. For example, Dervin's sense-making metaphor sees information behavior as process of continuous movement in some problem area (Dervin & Nilan 1986), while Taylor (1986) suggests that users' perception of their problems change as they move through the time dimension. However, while in the case of Dervin and Taylor dynamism is seen as a long-term process and within one problem area, the study findings revealed that information encountering provides the users a vehicle for incidents of short-term movement "across" time in different problem areas.

The study supported iterative and haphazard aspects of information behavior that are recognized in Bates' (1989) "berrypicking" model. This model suggests that, in contrast to the classical, linear model of information retrieval, real life information seeking is a "bit-at-a-time retrieval" that changes over a period of time. (p. 410). However, the Bates' model describes, again, users' information seeking in the context of *one* evolving problem/solution process. This study's findings suggested that, by encountering information, respondents also "berrypicked" across different problem areas.

The identification of the problem and interest type of information in respondents' experiences of information encountering could be compared with similar categorizations provided in the literature. For example, Childers (1975) and Krikelas (1983) identified that information seeking (gathering) can be problem specific and non-problem specific. The findings of this study contributed an additional layer of complexity to this simplified categorization. The both types of information seeking (problem specific and non-problem specific) are methods within which users can experience information encountering. Such information encountering, in turn, can result in problem-specific (problem type) and non-problem specific (interest type) information.

The type of information encountered could also be addressed in the context of Taylor's (1962) early work on the process of asking questions and the four levels of information needs: visceral, conscious, formalized, and compromised. It appears that information encountering addresses all four types of needs. Interest-type information would address visceral (unexpressed, unarticulated) needs, as well as conscious (but not yet formalized needs). Both kinds of needs have not yet been expressed as a formal statement and presented to an information system. The problem type of information addresses formalized (but not yet expressed) and compromised needs (needs presented to information systems).

Implications

Two groups of implications could be drawn from this study:

1. Implications for the information users; and
2. Implications for the information system design.

The study findings may inform information users about the existence of different practical approaches to acquisition of information. For example, for

super-encounterers information encountering is a consistent source of useful information. They rely on information encountering as a type of information acquisition and use various approaches to "let it happen". The super-encounterers in the study were aware of their information-encountering capabilities and believed that other people could also learn how to benefit from information encountering.

The beginning step in "accepting" information encountering is to embrace the notion that information encountering may provide information users with information that is as useful and applicable as information acquired by directed and focused information seeking. With the help of positive reinforcement from information encountering, users may be able to initiate the cycle of successful information-encountering experiences. Finally, non-encounterers may also learn from super-encounterers how to deal with information overload and still have satisfying information-encountering experiences. While the super-encounterers in the study felt the pressure of the abundance of information "waiting to be encountered", they had developed successful individual approaches to cope with this problem.

The second group of study implications relates to information systems design noting that information systems addressed here have a broad context and extend from traditional information services to less formally organized depositories of information. The study findings suggest that in order for information systems to become conducive to information encountering, they should have characteristics that facilitate and do not inhibit information encountering. Information systems that facilitate information encountering could provide access to information that will make the information contents "more browsable." As suggested by Bates (1989), in the context of information seeking "systems should be sufficiently flexible to allow the user to adapt the information-seeking process to his own current needs." (p. 421) However, systems may also include some "extra" features to encourage users' curiosity, to urge them to explore the information environment more fully, and in such a way encounter information. Just such a feature is provided on several Web sites where a click on a button provides an access to a purely random WWW address.

However, information systems should be also designed not to inhibit information encountering. This may occur if users are discouraged from effectively browsing, or if the interface of some information system is constrained only to a focused information search environment. For example, respondents in the interviews complained about technical limitations of Internet resources, especially the low response time, that makes it impossible for them to effectively explore, and retrieve information. (Erdelez 1996) An example of constraining the information environment could be seen in a recent trend to develop information systems with highly specialized subject domains. The imposed separation of these domains discourages exploration and cross-discipline encountering

that was praised by the super-encounterers in the study. It is, therefore, important that information systems developers become aware of information encountering and other methods of users' real life information acquisition when making decisions on information presentation and accessibility.

CONCLUSION

The study provided an initial understanding of the characteristics and functions of a type of information acquisition that does not involve directed and focused information seeking. The recognition of information encountering – especially how it shifts users across time, parallel problem areas, and different subject areas – may contribute to the creation of models of information behavior that resemble actual user information behavior. However, more research is needed to explore some aspects of information encountering that were brought up in this study – for example, the specific characteristics of information encountering in the information saturated electronic environment. Due to the nature of the information encountering phenomenon, the success of future research efforts would require a high level of respondents' cooperation. The interest and excitement many respondents expressed while participating in the reported study promises that it would be possible to attain such intensive cooperation.

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