A Critical Review of the Literature to Understand What Information Science is and How It Differs from Other Sciences

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Abstract

This article provides an analytical literature review of the field of information science and discusses recent definitions, terms, and concepts to recognize the kind of science that information science could be. It also analyzes major concepts in information science field such as information behavior, information seeking, and information use. The article shows that information science field could cover many disciplines under its big umbrella, and many shared aspects such as human behavior and interaction could be measured differently in information science field.

Keywords*: Information Science, Information Behavior, Information Seeking Behavior, Human Information Behavior*

1. What Kind of Science is Information Science?

Defining information science is a challenge for many information scientists. Considering the field of information science in the way this question poses, is something that was not in the forefront of my thoughts. My previous definition of information science was a field in which researchers study about how people utilize information resources effectively. Determining what kind of science it is did not seem to be a difficult question until I started searching for answers. After searching for only a short time, I found that my understanding of how to precisely define this field as a science was uncertain. It was not an easy task, and I spent a long time in an effort to understand why there is no single definition of information science. To specifically define information is debatable. In fact, the majority of research reveals that information can be objectively defined; therefore, it is based on backgrounds of people and understanding of information science. For example, information in healthcare can be defined differently than any other field's information. In this paper, I will highlight on some major aspects that may help create a more comprehensive understanding of the complex field of information science and determine where it fits in terms of a kind of science.

In order to understand this complicated field, it is very important to review the major works within this field. However, deciding whether the work is under the information science field or not is a challenge due to the information science boundary being fuzzy and hard to precisely establish. Researchers from different related disciplines have discussed topics that directly or indirectly relate to information science. Information behavior analysts, information system engineers, and information economists are few examples of scientists who share the word information in their titles and who are "centered on the idea of information" (Robinson, 2009, p. 581); however, they may not share the same research interests. Therefore, while searching for articles specific to the information science field, using article names alone is not adequate criteria to find the work of the IS field. It is often necessary to look at the publication name as well as other details, such as the author's field of research. Hawkins (2001) found that the best way to understand the work of the information science field is "to consult its abstracting and indexing publications" (p.44). The author in this article used the Information Science Abstracts (ISA) as a main source for his analysis. Later, he formed a new map that can be used to understand the overlapping of information science with other fields, but before discussing his information science map, we need to go through some of the past work in this dynamic field.

In a content analysis of volumes 36 to 40 of the Annual Review of Information Science and Technology (ARIST) publication, most of the submissions were written by social and behavioral scientists (Cronin, 2008).

Moreover, it is very interesting that well-known names from outside the IS field were found in the ARIST publication and others, such as the Journal of Information Science (JIS) and the Journal of the American Society for Information Science and Technology (JASIST). Some of the names were "Pierre Bourdieu (social and cultural capital), Manuel Castells (networked society), Harold Garfinkel (ethnomethodology), Anthony Giddens (structuration), Bruno Latour (Actor-Network theory) and Robert Merton (Matthew effect)" (as cited in Cronin, 2008, p.472). Buckland (2011) found information science "is concerned with cultural engagement". His objective in this article is to distinguish the information science field from other fields. One of the distinctions is that researchers from computer science, entropy, and information technology focus on electronic and technical aspects that are merely related to computer and communication systems; however, the information science field focuses on knowing, learning, and expanding knowledge (Buckland, 2011). He concludes that scientists in the information science field should focus more on "knowing about" not with "knowing how" and "knowing that". However, we cannot separate other fields from information science since they naturally include topics and subjects that create variant explanations of the major information science discipline. Consequently, we are lead to think about the concept of multidisciplinary. The majority of researchers accept that human and social sciences form the core study in information science field; however, information science is characteristically and categorically different from social sciences (Small, 1981). At the same time, Bawden (2007) found that other disciplines play a part, and added information science "underlies not one but several practical disciplines" (p.309). Harmon (1971, as cited in Hawkins, 2001) pointed out that the multidisciplinary information science field covers topics such as "behavioral science, classification, transfer, and language and linguistics" (p.46). Even though Harmon's article was published in 1971, and found that communication and behavior studies were related to information science, current literature proves that the relation is still valid today.

More recent studies, like Hawkins' (2001), found that computer science and information technology are other closely related fields to information science. He examined Library and Information Science Abstracts (LISA) to find the terms that describe what he called "pure" information science. Hawkins found that "behavioral science, librarianship, statistics, communications, law and government, communication, and other subject disciplines" (p.50) are other related disciplines to the information science field. Although information science and library science are found together as one name, Saracevic (1999, as cited in Hawkins, 2001) found that they are different sciences with a strong interdisciplinary relation. Now, we have to be careful, since a multidisciplinary field may include an infinite number of fields that may make the IS boundary fuzzier than it is already. In this sense, Bawden (2007) and Bates (1999) established a distinguishable declaration about information science as "a multidisciplinary field of study, involving several forms of knowledge, given coherence by a focus on the central concept of human recorded information" (p.309). Thus, a map that helps determine which disciplines are within the information science boundary was highly demanded. Moreover, White and McCain (1998, as cited in Hawkins, 2001) performed deep co-citation analysis to uncover more sub-disciplines of the field information science. Interestingly, the found 12 sub-disciplines, or specialties in information science. The results of this study affirm that information science is a multidisciplinary science.

2. What is Information Behavior?

In another way to define information, Wilson (2000) gave different definitions for the most prominent concepts and terms in the field of information science. The author has defined the Information Behavior, Information Seeking Behavior, Information Searching Behavior, and Information Use Behavior. However, Wilson gave very broad definitions, and they were not specific to identify when the behavior starts and ends, or to identify the frequency of the target behavior and its duration. This is one of the issues in information science field when comparing it with behavioral science. Information researchers only focus on the final outcomes rather than counting the behavior to find out the frequency, and its duration. In the following paragraphs, Wilson's information definitions were analyzed and some arguments regarding information behavior were formed. Wilson (2000) stated that information behavior is "the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given" (p.1). The first argument is that we cannot see a clear movement cycle. The behavior may start as an active communication or as a passive interaction with information sources. Determining the start and end is quite difficult with passive information behavior. The beginning of the behavior could be determined by the sensory connection between the source and the participant.

Sensory connections, however, are not directly observable, and the participant can help to discover them. Information Seeking Behavior is "the purposive seeking for information as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer- based systems (such as the World Wide Web)" (Wilson, 2000, p.1). This definition describes when a user starts searching and why a user search. We can see when a user needs information; he/she uses different sources to satisfy his/her information needs. The behavior may start when there is a need to satisfy an intended goal, and it may end when these goals are satisfied.

Information Searching Behavior is "the 'micro-level' of behavior employed by the searcher in interacting with information systems of all kinds. It consists of all the interactions with the system, whether at the level of human computer interaction (for example, use of the mouse and clicks on links) or at the intellectual level (for example, adopting a Boolean search strategy or determining the criteria for deciding which of two books selected from adjacent places on a library shelf is most useful), which will also involve mental acts, such as judging the relevance of data or information retrieved" (Wilson, 2000, p.1). From this long definition, user behavior can be seen based on user needs and the interaction with computer devices; however, the human computer interaction may be a long cycle. All of these interactions can be determined based on researchers' definitions of their target behavior. For example, researchers can define information behavior as the use of the mouse to understand when the behavior begins. In this example, researchers may record the number of right and left clicks as behavior. Very importantly, in some information behavior studies, researchers use computer transaction logs to count their target behaviors. In this case, by using computers, there is reliability, and therefore, there is a high level of accuracy. On the other hand, information scientists used more than on-site observers for high reliability, at the same time, in some studies, some researchers increased the reliability of their studies by applying some of qualitative methodologies, such as video-tape and audio recording.

Information Use Behavior "consists of the physical and mental acts involved in incorporating the information found into the person's existing knowledge base. It may involve, therefore, physical acts such as marking sections in a text to note their importance or significance, as well as mental acts that involve, for example, comparison of new information with existing knowledge" (Wilson, 2000, p.2). This is another example describes that behavior can be active or passive to measure implicit and explicit knowledge of information seekers. Arguably, the passive behavior is impossible to be observed; however measurements are possible.

3. Conclusion

It is not surprising that information science is defined as a multidisciplinary science. The analysis of famous abstracts in information science derives that more than one specialty fits under the large umbrella of information science. Thus, information science is worthy of the name of information sciences. Hawkins (2001) drew a map of information science that consists of 12 major disciplines and includes eight other separate fields that incorporate information science. Now, is this map updated? The answer is no, and it will never be complete since the field of information science is an active field with rapid changes. Collaborative information seeking behavior is a new concept, and can be found under social or behavioral sciences, management information systems, or maybe under library and information sciences. The future will create new directions that hold new disciplines, concepts, models, theories and more. The only way to control and manage the boundary of information science is to continually analyze the abstracts of information science and sort them into major disciplines and shared sub-disciplines.

From the analysis of Wilson's article on information seeking behavior, it can be concluded that information researchers focused more on the final outcomes of the behavior. They described the causes and some of situational factors that establish the search, and they described some characteristics of searchers. However, researchers were not concerned about giving accurate definitions for specific target behaviors in their studies. The majority of studies were observational without pre-determined expectations of actual behaviors. In the area of Behavioral Science, this is may be arguable because information scientists were lacking a precise definition about what they were going to observe. Also, they depend on their observation to collect as much information as they can and then describe their data. Doubtfully, this is one of the issues in the information science field, since most researchers conduct their studies without giving any attention to defining their target behaviors.

In the behavioral science, a precise definition for every target behavior is a foremost component of any behavioral research. These gaps and differences in methodological approaches between behavioral science and information science is worthy of being investigated in the future.

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