

## Preface

The field of Information Science is becoming an increasingly important discipline today, as information needs become progressively complex and sophisticated in both developed and developing societies.

Diverse and broad-ranging, Information Science was defined by Hawkins (2001) as “An interdisciplinary field concerned with the theoretical and practical concepts, as well as the technological, laws, and industry dealing with knowledge transfer and the sources, generation, organization, representation, processing, distribution, communication, and uses of information, as well as communications among users and their behavior as they seek to satisfy their information needs” (p. 49).

Given this diverse scope of Information Science, theories are of prime importance to provide coherence, solidity, and autonomy to the field and facilitate understanding of the various issues relating to information needs and information transfer. Indeed, Information Science is underpinned by a growing body of theory which has evolved over the decades and which has been extremely important in guiding academic and applied research in order to enhance understanding of the needs and behavior of information seekers and to inform the design of information systems, products and services.

However, the field of Information Science has, over time, become relatively fragmented (Warner, 2001), especially with the changes in the nature of the information environment brought about by technological developments and the increasing use of the Internet as a major source of information. These developments have resulted in the need to address a wider range of issues within Information Science, and the consequent application of diverse theoretical and disciplinary perspectives.

On the one hand, Information Science continues to be profoundly influenced by a range of theories and perspectives developed in the pre-digital age, which focused on the ways individuals identify their information needs and go about meeting them. On the other hand, as the context of information seeking has shifted to the digital planet and electronic resources have largely replaced print documents, theories of technology adoption which originated in related sub-disciplines such as Information Systems have become increasingly relevant to the field of Information Science. These are crucial in providing understanding of the factors influencing the use of new technologies and helping to inform the design of user-friendly information systems and tools that facilitate the information transfer process. More generally, a number of meta-theoretical perspectives have been highly influential in shaping the evolution of Information Science, and they continue to be of relevance to the field today.

To date, there have been a few attempts to bring together in one source the range of theories that are more relevant to Information Science and important for understanding the overall context within which information seeking, information transfer and the design of information products and services take place. This is a significant gap in the literature and one which potentially exacerbates the fragmentation and lack of cohesion of the discipline.

This book is intended to fill this gap by providing a concise overview of 15 of the most influential and relevant theories which have informed the field of Information Science and its information behavior sub-field and which continue to contribute importantly to the field today.

## **BACKGROUND AND PURPOSE OF THE BOOK**

Information Science has recently changed dramatically, due to the impact of technology and the changing nature of user needs and information seeking behavior as they adapt to the new information environment. Despite these changes, the concerns and interests of researchers, educators and practitioners working within this field have remained broadly consistent: to understand and build knowledge about the needs of information seekers and the ways in which they think and behave in the process of meeting these needs, so that information systems, services, tools and resources can be developed to facilitate information searching, transfer and retrieval. In this context, meta-theories, theories and models continue to play an important role in assisting Information Science specialists to make sense of the complex phenomenon of information seeking and related issues, providing frameworks for research, teaching and application development.

Meta-theories represent the overarching perspective or set of ideas through which a topic can be understood. Broad in scope, these are often grounded in, and reflect the work of, multiple theorists and they draw on a range of disciplines. Four important meta-theories that have been influential within Information Science over time are discussed within Part 1 of the book. While each of these has been dominant at various phases in the evolution of this field, they also provide complementary perspectives on and ways of understanding, information seeking and information transfer and all have continuing relevance to Information Science today.

In contrast to meta-theories, theories are narrower in scope and have been defined as “a system of assumptions, principles and relationships posited to explain a specified set of phenomena” (Bates, 2006). Within Information Science, two main categories of theory are of particular importance. Some of these are referred to as models rather than theories since they are less developed than full theories or have not yet been fully tested for validity, but have nonetheless become established as important explanatory frameworks within Information Science and they are therefore included.

The first category of theories, discussed in Part 2 of the book, consists of theories of information needs and seeking behavior. Since the early 1980s, numerous theories have been put forward to explain the ways in which users identify and conceptualize their information needs and the ways in which they search for information to satisfy these needs. Many were developed on the basis of research with traditional users of libraries and other information sources at a time when text-based information sources were most commonly used, or when computers were used only to search catalogues of print-based sources. In recent decades, this situation has changed dramatically with the expansion of the Internet and the extensive digitization of all types of information resources. Many of the traditional theories of information needs and information seeking behavior have stood the test of time, however, and are now being applied to the online information searching context and are proving useful in explaining user needs and behavior in a wide range of contexts and disciplinary fields.

The second main theoretical category, covered in Section 3 of the book, consists of theories of technology adoption. These have become increasingly important in Information Science as information systems and seeking have become more and more technology-driven. Information seekers differ in their

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receptiveness and ability to use new technologies and new forms of information, and technology adoption theories help generate enhanced understanding of user needs to help increase technology adoption rates and inform the design of user-friendly systems and tools. Empirical studies have indicated that technology adoption theories can explain around 40% of a user's likelihood of using particular types of technology and usage behavior, so they are of considerable importance to the field of Information Science.

Within each section of the book, a chapter is devoted to each key theory, and this describes the theory itself, as well as the background to its development, information on the theorist or other proponents with whom the theory is associated and other works within the field of Information Science which have been strongly influenced by the theory. The strengths and limitations of each theory and the ways in which it has contributed to the field of Information Science are also discussed, drawing on the Information Science and related literature, and each chapter concludes by assessing the continuing relevance and role of the theory to Information Science today. Many of the theories and models were originally set out in diagrammatic form by their proponents, and the book reproduces these in sharp, readily understandable graphics.

The book is divided into 3 parts, each containing a number of theories that are relevant to the theme of that section. It is expected that the book will become a highly valued resource within education and training in Information Science and its sub-disciplines, and an important reference text to help inform the design and development of information products, systems and services.

The first part of the book is devoted to describing and discussing the development and impact of four well-known meta-theories in Information Sciences. These are cognitive constructivism, social constructionism, activity theory, and Dervin's sense-making theory. All these meta-theories are broad in nature and have origins with other social sciences' disciplines.

The first chapter of the first part of the book explains how the cognitive constructivist approach evolved in the 1970s and 1980s as a response to the traditional information transfer model. The earlier model had assumed users to be passive recipients of information which was immediately understandable and useable by them. In contrast, social constructivists, influenced by the philosophical work of Kelly, Piaget and Bruner, argued that individuals themselves create knowledge from information by building mental models based on their prior experiences and the social context in which they live. The chapter explains constructivism and the role it has played in the development of Information Science and organizational performance, including its influence on leading theories of information seeking behavior such as those of Ingwersen and Kuhlthau.

Following Cognitive Constructivism, Social Constructionism, which occupies chapter 2 of the book, came to the forefront of Information Science in the late 1990s and the 2000, grounded in the earlier theories of Foucault and Bakhtin. According to this perspective, information only becomes meaningful knowledge through the process of social discourse and conversation between individuals. As a result, language rather than cognitive processes are the main focus of study. In Information Science, the researchers most closely associated with this perspective include Talja et al. and Frohmann. The factors influencing this meta-theory coincided with the explosion of digital resources and Internet use, and the emerging need to use appropriate language to engage and interact effectively online with users of online libraries, databases and other resources.

Understanding human behavior while considering the environmental and socio-cultural factors in which the information seeking behavior takes place is the concern of activity theory which has further influenced the development of Information Science. The activity theory, which is Chapter 3 in this section, also addresses issues related to individual experiences and backgrounds as well as the capability to recognize and assess information needs and motivations behind them. This chapter covers issues related to the emergence and development of activity theory, the role of mediation and its importance in the acquisition of knowledge, as well as cultural factors associated with the use of information.

Next, in Chapter 4, is Dervin's Sense-Making which was developed within the cognitive, constructivist tradition. Dervin argued that although the information process involves a transfer of meaning from the source or sender of information to the recipient, information can only exist in a mentally processed form and this is shaped by the use that the recipient puts it to, in the context of their own information needs. Dervin defined four main components of this "sense-making" process, consisting of the situation in which the information need arose, the gap between the current and desired situation, i.e. the uncertainty; the outcome of the process and the "bridge" that is the means by which the gap between need and outcome are closed. Dervin's theory has been used extensively in the study of information seeking but has also been subject to criticisms which have often been leveled at constructivist arguments. The chapter discusses issues related to its origin, development, debatable theoretical issues, and its impact on the study and interpretation of information seeking behavior.

Part 2 of the book includes 7 models and theories which have had profound impact on the practice and research of information seeking behavior, and user studies, and the overall discipline of Information Science. These are Krikelas' Model of Information Seeking (1983), Wilson's Information Seeking Behavior Model (1981, 1996, 1999), Bates' Berrypicking Model (1989, 2002, 2005), Akerlof's Theory of Information Asymmetry (1970), Chatman's Theories of Information Behavior (1996, 1999, 2000), Information Grounds Theory (1999, 2004), and Soft Systems Model (SSM).

Chapter 5, in the second part, addresses Krikelas' model which was also developed within the constructionist perspective, with a focus on individual cognitive processes. The model defined information need as the acknowledgement of uncertainty, and described the process whereby individuals build mental maps and identify knowledge gaps within these mental maps that create either immediate or deferred needs for information. In order to address immediate needs, Krikelas theorized, individuals either draw on their own memory (internal) or on other people or documented sources of information (external). The model has been important in highlighting the role of other people, such as librarians or information specialists, in the information seeking process. The chapter considers the ways in which Krikelas' theory has influenced Information Sciences, especially the development of library and information services, and considers some shortcomings and limitations of the model. It also highlights emerging trends and challenges that have impacted on this model such as the development of information and communication technologies.

In Chapter 6, Wilson's model of information seeking behavior is tracked and described. The series of Information Seeking Behavior Models developed by Wilson have been especially important in highlighting the role of contextual factors in information seeking. In the earliest version of his theory, Wilson argued that all information needs are secondary, and arise from more basic, primary needs which can be physiological, cognitive or affective in nature. In attempting to meet their various information needs, individuals typically come up against intervening variables which present barriers to be overcome in information seeking, such as technological or economic constraints, and constraints arising from the social or political environment, as well as their own characteristics such as level of self-efficacy. Wilson's revised models

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acknowledged that these intervening factors provide opportunities for, as well as barriers to, effective information seeking, and integrated the work of other Information Science theorists into his model to produce a more comprehensive framework to study information seeking and its outcomes. The chapter discusses the evolution of Wilson's Model over time, and re-considers its importance in Information Science today, particularly for understanding the nature of information seeking in developing countries.

The Berrypicking Model which is elaborated in Chapter 7 draws on the biological and socio-cultural perspective which argues that information seeking is not a systematic search process, but rather takes the form of berrypicking or finding information gradually using a range of sources of information. According to this theory, an information seeker gathers and collects most retrieved information sources through passive and undirected behavior. The process of collecting, according to Bates, which refers to it as Berrypicking, represents browsing and directed searches for information which have evolved from foraging behavior. This chapter defines and explains the berrypicking model, reviews the related literature, and discusses its impact on the development of information seeking behavior.

Continuing from Part 2, Waseem Afzal, the author of chapter 8, aims to (1) build on previous work (2) suggest a set of concepts, and (3) describe examples of information asymmetries in order to propose a framework for a general theory of information asymmetry. Afzal provides a brief overview of the concepts of information asymmetry and information imperfection. He also proposes a set of four concepts considered to be of importance in understanding information asymmetry; describes two major categories of information asymmetries; discusses different types of informational disturbances; and finally discusses the potential effects of information asymmetries.

In Chapter 9, Abdullahi Musa aims to advance the understanding of social contexts and cultural situations in information behavior processes using Chatman's three theories of information behaviors: Theory of information poverty (Chatman, 1996), theory of life in the round (Chatman, 1999), and the theory of normative behavior (Chatman, 2000). Musa provides a history, overview and the relationships between Chatman's three theories in the light of the social dynamics of information seeking and use. He begins by discussing the theoretical approaches to human information behavior to prepare the ground for a discourse on Chatman's theories. He then outlines and discusses Chatman's three theories. Finally, he reviews and synthesizes a number of studies that have adopted Chatman's theories as a frame to guide their investigations.

Chapter 10 examines the theory of Information Grounds which was developed by Fisher and her colleagues in the late 1990s and early 2000s to describe and interpret information seeking behavior in a contextual approach. The importance of the theory lies in its rapid rise to an influential position in Information Science and its impact on information seeking behavior. This chapter outlines issues related to the emergence and development of Information Grounds first as a notion, and later as a theory when it received growing interest from the information community. The chapter also analyses and summarizes the relevant key empirical literature in Information Grounds and discusses its impact on studying and interpreting the information behavior of users in various contextual backgrounds. Future directions in Information Grounds are also suggested on the basis of the current research.

The last theory in this Part appears in Chapter 11 and is the Soft Systems Model (SSM) developed by Checkland (1981). Nabhan Al Harrasi in this chapter aims to understand the existing of library and information science (LIS) literature that has been used in SSM applications. It focuses on the purposes and validity of using SSM in LIS. He then discusses the using of two streams of SSM in LIS: the stream of logic-based enquiry and the stream of cultural enquiry. Finally, he reports the changes and action resulted by using SSM in the field of library and information management.

The third part of the book comprises five important models and theories that have impacted on the development of research on information seeking behavior and the use of information for a long time. These covered models and theories include Ajzen and Fishbein's Theory of Reasoned Action and Theory of Planned Behavior; Davis' Technology Acceptance Model, Venkatesh et al.'s Unified Theory of Acceptance and Use of Technology, and Rogers' Innovation Diffusion Theory.

The Theory of Reasoned Action (1980), described and discussed in Chapter 12 of this book, has formed the basis of most subsequent theories and research on technology adoption, and therefore it has been extremely influential in Information Science as the information environment has become increasingly technology-based. This socio-psychology based theory postulates that individual behavior, including the acceptance or rejection of a particular technology, is influenced mainly by subjective beliefs about the consequences of information behavior and the social norms which determine whether the behavior is acceptable and desirable. External factors can only influence behavior through changing the individual's beliefs and perceptions. This chapter draws on the literature of Information Science to describe the development of the Theory of Reasoned Action and its relation to other theories such as the Technology Adoption Model. The chapter also identifies the impact of this particular theory on the development of Information Science.

A variant of the TRA, the Theory of Planned Behavior (1988) in Chapter 13 was also developed by Ajzen to incorporate the influence of "perceived behavioral control." This is defined in terms of the individual's skills as well as the resources and opportunities perceived to be available to them, and is similar to Bandura's concept of self-efficacy. According to the TPB, the individual's own attitudes, subjective norms, and perceived behavioral control determine their intentions. Those drive their behavior, such as the use of technology. The chapter aims at describing the development of the Theory of Planned Behavior, highlighting its limitations, and discussing its implications for accepting, adopting, and using information systems and services.

The third part of the book examines The Technology Acceptance Model which is covered in Chapter 14 as one of the most important models within technology adoption research in recent decades and it continues to be important in Information Systems design. Modified from the TRA, this model removed the mediating influence of attitude and proposed a direct link between perceived usefulness and perceived ease of use of a technology, along with intention to adopt. It was argued that high levels of perceived usefulness and ease of use counteract the influence of a negative attitude towards a technology, especially in the work context. The validity of the theory has been demonstrated in many empirical research studies. In this chapter, the TAM and its links to earlier technology adoption theories are discussed and examples of empirical studies demonstrating its validity are cited.

Continuing with technology adoption, Chapter 15 examines Unified Theory of Acceptance and Use Technology (UTAUT) which is one of the most sophisticated models of technology adoption that has been influential within Information Science. It integrates components from eight existing models and theories, including the TRA, TPB, TAM, and social cognitive theory. The model consists of four determinants of technology adoption, defined as Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. It includes four moderating factors of gender, age, experience and voluntariness of use as well as two dependent variables: Behavioral Intention and Use Behavior. Empirical research indicates that 70% of variance in user intention can be explained by the model. The UTAUT model and the research conducted to validate it are discussed in this chapter. The chapter also discusses recent trends on the implication of this model and provides further explanation and explores new directions for future research.

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Chapter 16, the last chapter in this book, offers a more general theory of technology adoption. This theory has for decades been very influential in Information Science not least because it was the foundation for later models which have been dominant in this field, such as the TAM and UTAUT. Rogers defines the individual-level process that influences the spread of a technological innovation within a social system as consisting of five stages: Knowledge, Persuasion, Decision, Implementation and Confirmation, and identifies five different social groups based on their propensity to adopt an innovation at an early or later stage of its diffusion through the population. The Innovation Diffusion Theory and its influence on later models of technology adoption are described and discussed in this chapter. Possible future expansion on research is also suggested.

This book has appeared at a crucial phase in the development of Information Science. At present, there is an unprecedented demand for information resources, tools and services in all societies of the world. While the Internet offers unlimited access to information, users need tools and services to help them navigate and evaluate the available resources, as well as information systems which provide user-friendly search and retrieval facilities. In this context, theories and models remain invaluable in providing specialists with the means to study and generate understanding of the needs and characteristics of information seekers and to inform the development of technological systems and applications which facilitate the location and retrieval of relevant information. This book provides an essential source of reference and educational tool for academic educators, professional trainers, students, practitioners and developers alike.

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