Overview

Why do users seek information? How do they seek information? How do they search for information? How do they use libraries?

These questions are addressed by the major information behavior models presented in this module. A model is a generalized representation of a phenomenon. More specifically, it is a theoretical construct that describes properties (components, processes) of a system or other phenomenon. It can serve as an explanation or illustration of a known phenomenon and as a proposed construct for further study.

Most models of information behavior relate to individual users' (1) motivations for seeking information, (2) information-seeking situations or contexts, (3) interactions with information systems, or (4) uses of information resources. All of these models

- are generalized, which means they apply to most people most of the time.
- ascribe to the research assumptions outlined in the module on information behavior concepts.
- are applicable to major areas of information practice

The examples below are a small subset of all available models. For a more complete overview of major information behavior models, see Wilson (1999).

1. Motivation models (Why do users seek information?)

Information seeking is driven by information need. Information need . . .

- is the recognition by the end user of a gap in his/her knowledge.
- provides motivation to seek information in a given situation to answer a question, solve a problem, complete a task, learn about a subject, or verify a fact.
- is interpretive, subjective, emotional, and influenced by personal and social factors.

Four major models are generally recognized. All four focus on users' cognitive state within the context of their information need or problem situations as these arise within certain information environments. They view information needs as gaps, anomalies, problems, and uncertainties respectively.
Sense-making (Dervin, 1992)

Sense-making uses a situation-gap-use metaphor. Individuals constantly strive to make sense of reality. As they move through situations in time and space, they recognize gaps in their knowledge that function as barriers to progress. Information is used to bridge the gaps by providing answers, advice, or help.

The user is seen as an active participant, not a passive recipient in the sense-making process. This is called a constructivist model because it involves internal (cognitive) and external (procedural) behavior that allows individuals to construct and design their movement through time-space. In practice, users who are encouraged to describe their situations, gaps, and uses can often diagnose and resolve their own information needs.

Anomalous State of Knowledge (ASK) (Belkin; see Belkin, Oddy, & Brooks, 1982)

ASK is based on the idea that information need arises from an anomaly (irregularity) in the individual's knowledge state.

This model arose in part from recognition that users can't easily express what they don't know or what is missing; that questions they submit to information systems often do not adequately represent what they need.

In order to get around this difficulty, an intermediary can focus on the user's problem statement, or description of how the information need developed.

Problem dimensions (Taylor, 1986) [not our textbook author]

Problem dimensions are characteristics beyond subject matter that establish criteria for judging the relevance of information to a problem. Dimensions include design/discovery, well-structured/ill-structured, and specific/amorphous goals.

Dimensions are continuous and are presented along with a range of relevant information attributes called information traits. Information traits include the quantitative continuum, data continuum, and temporal continuum.

Taken together, problem dimensions and information traits define the criteria by which users judge information and information delivery. These are part of Taylor's larger theory of value-added processes: the idea that users' criteria suggest IR system characteristics (e.g., the criterion of currency suggests that the system should be updated frequently).

Uncertainty principle (Kuhlthau, 1999)

The uncertainty principle concerns the challenges users face as they seek information. Uncertainty involves affective (emotional) dimensions, such as feelings of frustration and anxiety that users may experience in the early stages of information seeking, when their information needs are still vague and confused. Kuhlthau incorporates the uncertainty principle in her larger model of the information search process (below).

An aside: Obviously information need is where the whole information-seeking process begins. The irony of this concept is that so much attention in LIS is focused on what people don't know, or even, in ASK theory, what people don't know they don't know!
Applications: In her excellent synopsis of these models, Morris (1994) also discusses how understandings of information need guide the development of user-centered services, including:

- Reference
- Searching
- Indexing/cataloging
- IR systems design

### 2. Situation models (How do users seek information?)

Users engage in certain activities when seeking and searching for information to resolve their information needs. What is the difference between information seeking and searching?

- **Information seeking**: broad context involving any or all systems or resources accessed.
- **Information searching**: narrow context involving interaction with specific system or resource.

Researchers have developed many models of seeking and searching behavior. All incorporate concepts of information need at the outset. Most are process models that present activities in stages. Although the stages make the process look linear, the researchers are quick to point out that users often repeat stages in a circular or loop fashion. For this reason, information seeking and searching are often called **iterative** processes.

One of the best-known information-seeking models is by Kuhlthau. Although she calls this a search model, it is commonly viewed as a seeking model because it takes a holistic approach to the user’s entire information need situation.

**Information Search Process** (Kuhlthau, 1999; see also Kuhlthau, 1993; Allen, 1996)

1. Initiation: recognize information need
2. Selection: identify general topic
3. Exploration: investigate general topic
4. Formulation: focus on a point of view
5. Collection: gather information
6. Presentation: synthesize and use information

Kuhlthau developed this model after many years of observing students writing term papers. The model has evolved slightly over time, but should look familiar to anyone who specializes in children’s services because Kuhlthau is frequently cited in the school and public library literature. Some key characteristics of this model are that it:

- Applies to many kinds of information need situations (beyond school settings)
- Involves feelings (affective factors) at every stage, including uncertainty, optimism, frustration, confidence, and satisfaction
- Considers users’ evaluations on a continuum from relevance (information is on my topic) to pertinence (information is what I need for this task)
**Applications:** Information-seeking models help information professionals . . .

- Understand users’
  - Decision-making criteria
  - Process strategies
  - Expectations of search process
  - Attitudes and feelings

- Understand roles of mediators (see Kuhlthau, 1999)
  - How to diagnose users’ difficulties
  - When to intervene
  - How to intervene

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### 3. Interaction models (How do users search for information?)

Users interact with information systems in order to search for and retrieve information. Information retrieval (IR) . . .

- involves finding information in an information system
- is an interactive communication process
- is usually an indirect process, mediated by the information system
- may be initiated by end users or information professionals
- does not necessarily require a computerized database

LIS is concerned with two major kinds of interactions:

- Human-human interactions, such as interpersonal reference interviews and search negotiations
- Human-computer interactions, such as searching using computerized IR database systems

Substantial bodies of literature focus on each of these categories—they are probably the most-studied areas of information behavior. Interpersonal interactions are described by writers such as Kuhlthau who offer advice on ways to elicit questions from users, direct them to appropriate resources, and instruct them on how to use various information systems. These mediation methods are covered in courses on reference and access services.

Because this course covers principles of information organization for IR system retrieval, this module offers one generic model that focuses on the IR system search process. This model is derived from a number of sources that describe how information professionals ideally conduct searches through careful planning.
IR searching model (generic)
1. Recognize and state the need as a question
2. Develop search strategy (select sources, formulate query, translate query into system language)
3. Execute search strategy
4. Review search results
5. Edit search results
6. Evaluate results

Anyone with a background in a field such as management or education should recognize this as a variation on a classic problem-solving model: identify the problem, generate possible solutions, execute one solution, and evaluate the results.

Applications: This model implies that end users, in order to be successful, should conduct their searches like professionals. The model underscores the attention paid to natural language and controlled vocabulary in this course:

- Translation of a need into a question that can be expressed in words
- Translation of a question into a query that can be understood by the system
- The exact match principle: query and system terms must match in order for IR to occur

4. Resource models (How do users use libraries?)

Users may or may not successfully find information by exploiting library resources and tools. Success depends on both the design of the resources and the skills of the users.

Library finding tools and resources are of course explained in other courses and their textbooks. However, Mann (1993) does a particularly good job of describing approaches to searching based on the organization of library resources. He presents a series of models, some related to the resources themselves and some related to how people use the resources.

How resources are intended to be used

Mann presents the idea that, as a result of their information organization, library resources can both reveal and conceal search options. For example, controlled vocabulary can improve precision and recall, but the terms may not be what the user expects. Major models are:

- Specific subject or discipline (art index, humanities index, business index)
- Traditional library science (three kinds: classification scheme, vocabulary-controlled catalog, and published bibliographies and indexes)
- Type of literature (almanacs, atlases, bibliographies, catalogs, chronologies, computer bulletin boards)
- Computer workstation (electronic gateway to many resources)
How resources are really used

Here Mann's thesis is that people's perceptions of the resources affect their ability and desire to use them in the way they were intended. A common misconception of computers, for example, is that one workstation can provide access to the entire universe of knowledge. Major behaviors include:

- Actual practice (footnote-chasing instead of searching, browsing shelves instead of using catalog)
- Principle of least effort (accepting low-quality information because it is easily available)
- Methods of searching (searching using the most appropriate type of vocabulary and resource)

The last model, methods of searching, is Mann's ideal: the search can be approached through controlled vocabulary or natural language, print or electronic resources, etc. The methods of searching model is flexible and accommodates users' habits; Mann claims it works regardless of the subject area, language, or format.

**Application:** Mann's approach can . . .

- help users understand and exploit organization of resources in libraries
- help librarians improve organization of resources to better accommodate users' searching styles

(Mann's book, by the way, is an eye-opening introduction to library use for new LIS students!)

Too many models?!

How does one deal with all of these models? Information behavior is extremely complex. Each model attempts to explain behavior in its own way, and no one model has been accepted universally. Each model was developed for specific purposes or applications. The information professional can adopt the model relevant to the practical task at hand, as a way of understanding the bigger picture of user behavior.

Unfortunately, all of these models lack a holistic, balanced view of the relationship between users and IR systems. Here is one more model (at the risk of overload!) that is intended to be holistic:

**Model of the IR Process** (Saracevic, 1996)

- Environment
- Situation
- User knowledge, etc.
- Query characteristics
- Interface
- Computational resources
- Informational resources

This model shows the IR process as seven levels that range from very broad (environment) to very narrow (query). The levels exist on a continuum, with adaptation flowing from each end toward the middle and converging at the query and interface levels. The idea is that users adapt to systems (e.g., through training) and systems adapt to users (e.g., through online helps). Saracevic's goal is to bring understandings of information behavior and IR system design closer; to encourage behavior researchers and system designers to communicate more effectively.
Implications for practice

Information professionals include both service providers (librarians, intermediaries) who interact directly with users and technology experts who design and maintain IR systems. In order to effectively serve users, all of these experts should understand their users’ . . .

- Demographics
- Knowledge levels
- Information problems
- Individual differences
- Information environments
- Information tasks and need situations
- Information-seeking and searching behaviors

Further, service providers and technology experts should collaborate to create IR systems that:

- acknowledge and fit into the total information environment
- accommodate natural information behaviors
- accommodate differences among individual users

Good information practice relies on research and sensitivity!

Cites & sites

References


