



# A STUDY OF MODELS OF INFORMATION SEEKING BEHAVIOR AND THEIR RELEVANCE IN DIGITAL INFORMATION ENVIRONMENT

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## Abstract

*Information seeking behavior (ISB) is a fundamental area of research in Library and Information Science, focusing on how individuals identify information needs, search for information, and use retrieved information. This study examines major models of information seeking behavior, including Wilson's Model, Kuhlthau's Information Search Process, Ellis's Behavioral Model, Dervin's Sense-Making Model, and Bates' Berrypicking Model. The objective of the study is to analyze the core concepts of these models and assess their relevance in contemporary digital information environments. Using a qualitative review of existing literature, the study compares the models based on their focus on cognitive, emotional, and contextual factors influencing information seeking. The findings indicate that no single model fully explains information seeking behavior; rather, each model contributes unique perspectives. The study concludes that an integrated approach combining multiple models is most effective for understanding user behavior in modern, technology-driven information systems.*

**Keywords:** *Information Seeking Behavior, ISB Models, Library and Information Science, User Behavior, Digital Information Environment*

## 1. Introduction

Information is a vital resource in modern society, influencing decision-making, learning, research, and professional practice. The way individuals recognize their information needs and seek information has become an important area of study within Library and Information Science (LIS). This area of study, commonly referred to as Information Seeking Behavior (ISB), examines the processes, strategies, and factors that shape how users search for, access, evaluate, and use information from various sources.

With the rapid growth of digital information systems, online databases, search engines, and social media platforms, information seeking behavior has become increasingly complex. Users are no longer dependent solely on traditional libraries; instead, they interact with multiple information environments that influence their search patterns. Understanding these behaviors is essential for designing effective information systems, improving information services, and enhancing user satisfaction.

Over the years, several theoretical models have been developed to explain information seeking behavior. These models aim to describe different aspects of the information seeking process, including cognitive, emotional, social, and contextual factors. Prominent



models such as Wilson's Model of Information Seeking Behavior, Kuhlthau's Information Search Process, Ellis's Behavioral Model, Dervin's Sense-Making Model, and Bates' Berrypicking Model have significantly contributed to understanding how users seek and use information. Each model offers a unique perspective and highlights different dimensions of user behavior.

This study focuses on examining major models of information seeking behavior and analyzing their relevance in contemporary information environments. By understanding these models, information professionals can better anticipate user needs, reduce barriers to information access, and develop user-centered information systems. The study also emphasizes the importance of integrating multiple models to gain a comprehensive understanding of information seeking behavior in today's dynamic and technology-driven world.

## 2. Earlier Studies

The research on information seeking behavior has developed significantly over the past several decades, with scholars proposing various models to explain how individuals recognize information needs and seek information. One of the earliest contributions was made by Taylor (1968), who identified four levels of information need—visceral, conscious, formalized, and compromised—highlighting the difficulty users face in clearly expressing their information needs. Taylor's work laid the foundation for user-centered approaches in information services.

Belkin (1980) introduced the concept of the Anomalous State of Knowledge (ASK), suggesting that information needs arise from a gap or anomaly in a user's knowledge structure. This model influenced the design of information retrieval systems by emphasizing the importance of understanding users' imperfect or incomplete knowledge during the search process.

Wilson (1981, 1996) presented a comprehensive model of information seeking behavior that integrates information needs, seeking behavior, and information use within a broader context. Wilson emphasized the role of intervening variables such as psychological, demographic, environmental, and social factors that may facilitate or hinder information seeking. His model is widely recognized for its holistic approach and continues to be extensively cited in LIS research.

Ellis (1989) focused on identifying common patterns of information-seeking activities rather than linear stages. Through empirical studies of researchers, Ellis identified behaviors such as starting, chaining, browsing, differentiating, monitoring, and extracting. This behavioral approach provided valuable insights into how users interact with multiple information sources, particularly in academic and professional environments.

Kuhlthau (1991) proposed the Information Search Process (ISP) model, which introduced the emotional dimension of information seeking. Her model describes six stages of the search process and associates each stage with specific feelings, thoughts, and actions. The ISP model has been especially influential in educational contexts, demonstrating how uncertainty and anxiety affect users during information seeking.

Dervin's Sense-Making Theory (1983) approached information seeking as a process of constructing meaning to bridge gaps in understanding. This model emphasizes the user's



situation and context, focusing on how individuals use information to make sense of their experiences. Dervin's work has been widely applied in studies of communication, information behavior, and user-centered system design.

As far as the comparison of various models are concerned, Dhiman and Rani (2013) have also explored various models prevalent in contemporary times briefly. Further, recent studies like that of Pandey and Dhiman (2020) have explored the applicability of these classical models in digital contexts, such as online databases, search engines, and social media platforms. Researchers have emphasized the need for integrating multiple models to better understand complex user behaviors in contemporary information environments. The literature suggests that while traditional models remain relevant, they must be adapted to reflect technological advancements and changing user practices.

### 3. Objectives of the Study

The main objectives of this study are as follows:

1. To identify and analyze major models of information seeking behavior proposed by leading researchers.
2. To compare different information seeking behavior models based on their approaches, components, and applicability.
3. To evaluate the relevance of classical information seeking behavior models in contemporary digital information environments.
4. To explore recent trends and developments in information seeking behavior research.
5. To highlight the implications of information seeking behavior models for information system design and library services.
6. To examine the concept of information seeking behavior and its significance in Library and Information Science.
7. To suggest an integrated approach for understanding user information seeking behavior in modern information environments.

### 4. Methodology of the Study

The present study adopts a descriptive and analytical research design to examine various models of information seeking behavior and their relevance in contemporary information environments. The study is based primarily on a qualitative approach, focusing on the analysis and interpretation of existing scholarly literature.

### 5. Sources and Collection of Information on Different Models

The study relies on secondary data collected from a wide range of published sources. These include textbooks, scholarly journals, conference proceedings, research reports, and doctoral theses related to information seeking behavior. Electronic resources such as online databases, digital libraries, and institutional repositories are also consulted to access recent and relevant studies.

Relevant literature was identified through systematic searching using keywords such as *information seeking behavior*, *ISB models*, *user information behavior*, and *digital information environments*. The literature selected for review includes classical works as well as recent publications to ensure both theoretical depth and contemporary relevance.

### 6. Information Seeking Models



Information seeking models explain how individuals identify information needs, search for information, interact with information sources, and use the obtained information. These models help librarians and information professionals understand user behavior and design effective information systems.

### 6.1. Taylor Model of Information Seeking

Taylor's model of information seeking is a classical model that was proposed by in 1968 (Taylor, 1968). It is one of the earliest conceptual frameworks explaining how users articulate and refine their information needs. Taylor suggested that an information need does not emerge fully formed; rather, it develops through a series of stages. He identified four levels of need: the visceral need (an unexpressed and often subconscious feeling that information is required), the conscious need (a mental recognition of the problem), the formalized need (a clear statement of the question in linguistic form), and the compromised need (the query as it is finally presented to an information system or librarian). This progression highlights that the question users ask is often only a negotiated or simplified version of their original concern, shaped by context, language limitations, and system constraints.

This model emphasizes the crucial role of intermediaries, particularly librarians, in helping users clarify and articulate their needs effectively. Since users may struggle to translate their internal problems into precise queries, the reference interview becomes a vital process for uncovering the real information requirement behind the stated question. The model also underscores that information seeking is a dynamic and interactive process rather than a one-time transaction. Even in today's digital environment, where users interact directly with search engines and databases, Taylor's insights remain relevant because they explain why search queries often evolve through multiple attempts. Thus, the Taylor model provides a foundational understanding of user behavior in information systems and continues to inform research in information science and user studies.

### 6.2. Wilson's Model of Information Seeking

Wilson model has emphasized over the :

- Complexity of human needs
- Motivations for seeking information
- Barriers that may prevent seeking or obtaining information

However, Wilson's model has evolved over time, with three major versions and last one was made in 1999 that views information seeking as a response to an information need arising from a specific context. It emphasizes intervening variables such as psychological, demographic, social, and environmental factors that may influence or hinder information seeking.

- **Contextual Factors**  
→ Environmental influences, role demands, technology availability.
- **Intervening Variables**  
→ Psychological, social, personal factors affecting behavior.
- **Activating Mechanisms**  
→ Stress or problem recognition that triggers seeking.

- **Information Seeking Behavior**  
→ Active or passive pursuit of information.
- **Information Use**  
→ Application to resolve problem or satisfy need.
- **Outcome / Feedback**  
→ Leads to new needs or knowledge improvement.

#### Key Features of Wilson’s Model

- Human-centered: Focuses on the person, not just the system.
- Dynamic: Feedback loop acknowledges evolving needs.
- Barrier-conscious: Recognizes obstacles to seeking or using information.
- Multi-dimensional: Integrates personal, social, and environmental factors.
- Applicable broadly: From library users to online information behavior.

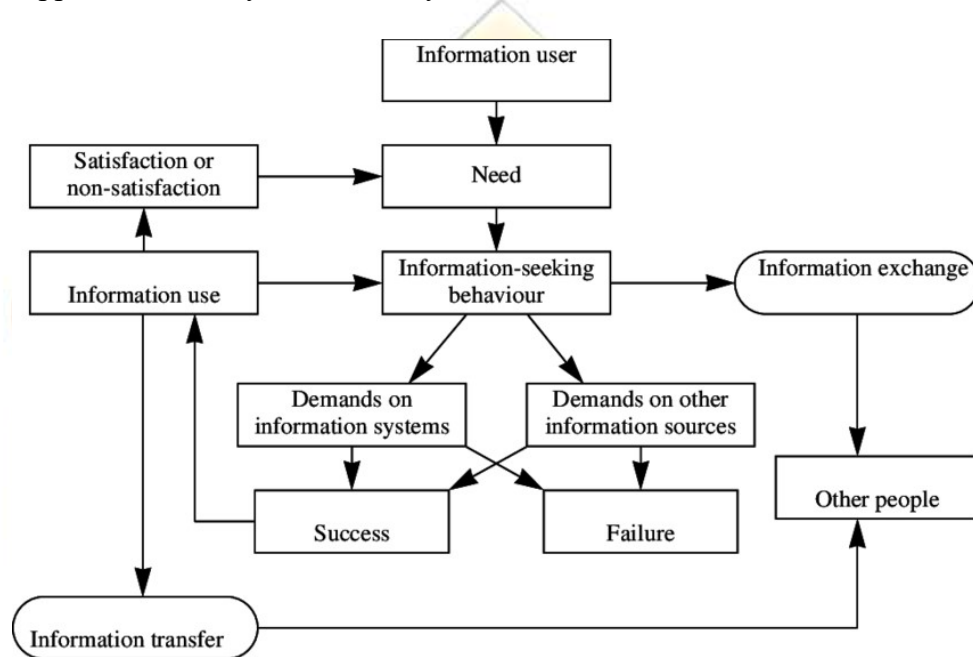


Figure 1: Wilson’s Model of Information Seeking Behaviour

(Source: <https://tinyurl.com/bdf6xb35>)

#### Criticisms of Wilson’s Model

- Too abstract and sometimes hard to operationalize.
- Doesn’t fully capture digital-age behaviors like social media or AI-based search.
- Feedback loops are acknowledged but can be more explicitly modeled.
- Some critics argue the model overemphasizes “needs” while downplaying chance or accidental discovery.

Nevertheless, it is very holistic and comprehensive and widely used library science research.

#### 6.3. Ellis’s Model of Information Seeking Behavior

Ellis’s Model was proposed by David Ellis in 1989, based on empirical research into how researchers seek information. Unlike models that are purely theoretical, Ellis’s approach



is behavioral, meaning it's grounded in the actual patterns of information-seeking activities observed in researchers across disciplines.

The model is often applied in library science, information studies, and user behavior research, helping us understand not just what people look for, but how they go about seeking it. It is Non-linear where users can jump back and forth between features; Iterative that often involves revisiting sources or repeating strategies. Besides, it is behavioral focus where users actually do, rather than what they "should" do. And user-centric that acknowledges that individual differences (experience, expertise, and preferences) shape information behavior.

There are following six features assigned to Ellis Model, they are given as under:

### 1. Starting

- Activities that help the user begin the information search.
- Consulting reference materials, general web searches, or reviewing previous research.
- Helps in forming an initial understanding or identifying key sources.

### 2. Chaining

- Following references or leads from one source to another.
- Backward chaining: Looking at the references cited by a source.
- Forward chaining: Looking at later sources that cite the current source.
- Reading a journal article, then examining its bibliography to find more relevant studies.

### 3. Browsing

- Semi-directed, exploratory searching through a collection of information.
- Helps users discover relevant information without a precise goal.
- Skimming journals, scanning shelves, or scrolling through online databases.

### 4. Differentiating

- Selecting sources or channels that are more relevant or credible.
- Focuses on quality and efficiency by avoiding irrelevant sources.
- Choosing peer-reviewed journals over general websites, or relying on subject-specific databases.

### 5. Monitoring

- Keeping up-to-date with new developments in a field.
- Ensures the researcher does not miss current research or trends.
- Setting up alerts, subscribing to newsletters, following citation networks.

### 6. Extracting

- Identifying and retrieving specific information from sources.
- Pulling out the most relevant facts, data, or insights needed for the task.
- Copying statistics, taking notes from articles, or summarizing research findings.

### Applications of Ellis's Model

- **Library Science:** Designing library layouts and catalog systems to facilitate browsing and chaining.



- **Information Retrieval Systems:** Helping database designers understand how users search and navigate.
- **Research Skills Training:** Teaching students strategies like chaining, monitoring, and differentiating.
- **User Experience (UX):** Creating interfaces that support diverse search behaviors.

#### 6.4. Kuhlthau's Model of Information Search Process

Carol Kuhlthau, an educational psychologist, developed the Information Search Process (ISP) Model in the 1990s to describe the cognitive, affective, and physical behaviors of individuals during information seeking. Unlike models that focus purely on the mechanics of searching, Kuhlthau emphasized the emotional and cognitive experiences people go through during the process. Kuhlthau research showed that information seeking is not linear, and emotions such as uncertainty, anxiety, optimism, and satisfaction play a crucial role in shaping how people search for information.

This model consists of six stages, each characterized by thoughts, feelings, and actions:

##### Initiation Stage

- The information need or problem is recognized.
- I have a task to do, but I don't know much about it yet.
- Uncertainty, apprehension, or anxiety.
- Begin exploring the topic superficially, often seeking general understanding.
- A student is assigned a research paper but doesn't know where to start.

##### Selection Stage

- A general topic or focus area is chosen.
- I need to narrow down my topic to something manageable.
- Optimism emerges, but uncertainty may remain.
- Identify potential topics, choose one that seems viable.
- The student narrows the topic from "Climate Change" to "Impact of Climate Change on Agriculture in India."

##### Exploration Stage

- Initial investigation and broad reading of available information.
- I'm learning more, but the information is confusing or contradictory.
- Confusion, doubt, frustration, anxiety—often the most emotionally challenging stage.
- Reading, browsing, talking to others, and noting different perspectives.
- The student reads multiple articles and studies but finds conflicting information about climate impact on crops.

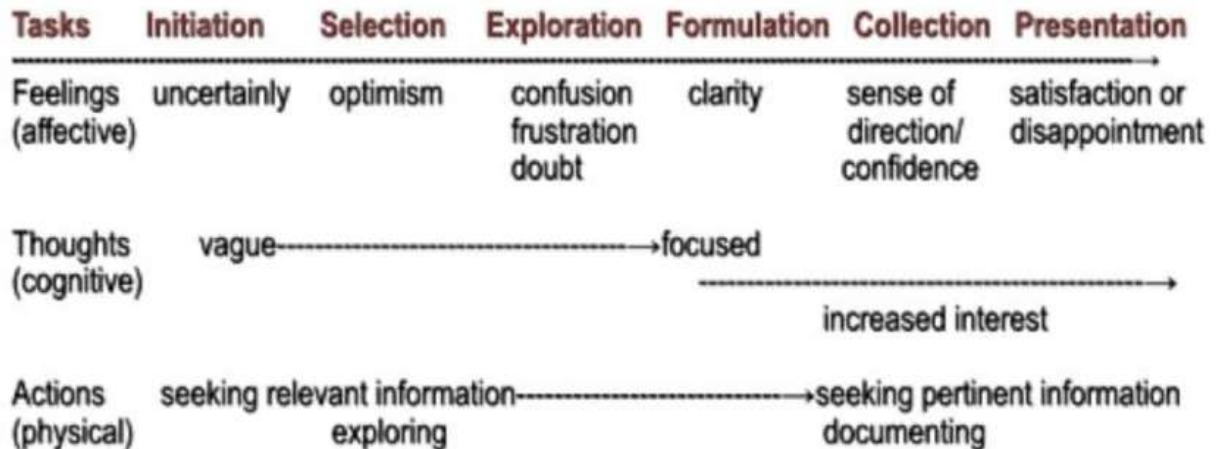


Figure 3: Kuhlthau Model of Information Search Process

(Source: <https://tinyurl.com/4n3bhvym>)

#### Formulation Stage

- Focus narrows further, and clarity emerges.
- I have a clearer understanding of my topic and can define a focus.”
- Confidence begins to build; uncertainty starts to decrease.
- Develop a clear thesis, formulate research questions or hypotheses.
- The student decides to focus on “Effects of changing rainfall patterns on wheat production in Northern India.”

#### Collection Stage

- Gather information specific to the focused topic.
- I know what I need, and I can find relevant sources
- Increased confidence, sense of control, and satisfaction.
- Collect detailed data, take notes, evaluate sources, and organize information.
- The student gathers research papers, government reports, and statistical data on wheat production and rainfall trends.

#### Presentation Stage

- Information is synthesized, conclusions drawn, and findings communicated.
- I can now complete my task and share my findings
- Relief, accomplishment, satisfaction.
- Write the paper, prepare a report or presentation, cite sources, finalize work.
- The student writes the research paper and prepares a presentation summarizing findings on climate change impacts on wheat production.

They key Features of Kuhlthau’s ISP Model include the integration of Cognition and Emotion. It highlights that feelings (uncertainty, confusion, optimism) are intrinsic to the search process.

#### Applications of the ISP Model

- **Education:** Helps teachers guide students in research projects.



- **Library Science:** Assists librarians in supporting patrons' information needs.
- **Knowledge Management:** Understanding employee information-seeking behavior in organizations.
- **Digital Information Systems:** Designing search engines and online databases that reduce confusion and support users' cognitive processes.

### 6.5. Dervin's Sense-Making Model

Dervin's Sense-Making Model was developed by Brenda Dervin in the 1970s and 1980s. It is primarily used in information science to understand how people seek, interpret, and use information. Unlike models that focus only on information systems or the availability of information, Dervin's model emphasizes the human experience, uncertainty, and the cognitive processes people go through when they encounter gaps in their knowledge.

The model revolves around three main concepts: Situation → Gap → Use. Dervin visualized this in what she called the "Situation-Gap-Bridge" framework.

The key features of the model are as given as under:

1. **User-centered:** Focuses on the human experience rather than the information itself.
2. **Contextual:** Information needs depend on the person's **situation, environment, and prior knowledge.**
3. **Subjective:** Gaps are **personal**; the same situation may produce different gaps for different people.
4. **Constructive:** Knowledge is **actively constructed** by the user, not passively received.
5. **Dynamic:** Situations and gaps change over time; sense-making is ongoing.

As far as its uses are concerned, the Sense-Making Model is widely used in library and information science, education, communication studies, and human-computer interaction. Some applications include:

- **Information behavior research:** Understanding why people search for information.
- **Designing information systems:** Creating systems that respond to contextual and subjective needs.
- **Education:** Helping teachers design materials that bridge students' knowledge gaps.
- **Communication studies:** Analyzing how people interpret messages based on their experiences.
- **Situation:** Where the person starts.
- **Gap:** The knowledge or understanding missing.
- **Bridge:** The means to fill the gap (information, interaction, reflection).
- **Outcome:** The sense made from the experience.

In spite, it requires careful contextual understanding, which may not be feasible in large-scale studies. Furthermore, it does not prescribe specific methods for bridging gaps; it's more conceptual than prescriptive.



## 6.6. Belkin's Anomalous State of Knowledge (ASK) Model

The ASK model was proposed by Nicholas J. Belkin in the 1980s as part of his work on Information Retrieval (IR). Unlike traditional models that focused on matching queries to documents, Belkin focused on user needs and cognitive states.

The Anomalous State of Knowledge is the perceived gap or uncertainty a user experiences when they seek information.

- It is **subjective**: Each person's perception of what they don't know is unique.
- It drives **information-seeking behavior**: People only search if they feel there's something missing or anomalous in their knowledge.

This model has following components of the ASK Model

1. **User's Knowledge State (K):**
  - What the user **already knows** about a topic.
2. **Anomaly (A):**
  - What the user **feels they don't know**; the "gap" in their knowledge.
3. **Problem Situation (P):**
  - The **context or goal** prompting the search.
  - Example: "I need to solve this homework problem" or "I want to write a report."
4. **Information Need (IN):**
  - The **information required** to resolve the anomaly.
  - It's a **function of the ASK**:  $IN = f(ASK, \text{Problem Context})$ .

As far as its uses are concerned, The model influenced IR and information science in several ways:

1. **User-centered design:**
  - IR systems should **understand user intentions**, not just match keywords.
2. **Query as a symptom:**
  - A user's search query is **not the need itself**, but a **reflection of the underlying ASK**.
3. **Dynamic knowledge state:**
  - Information retrieval is not static; it's a **process of knowledge evolution**.
4. **Supports exploratory search:**
  - ASK model is particularly suited for searches where users **don't know exactly what they need**, such as learning, research, or complex problem-solving.

But it has some limitations too, and these are:

- **Abstract and hard to operationalize:**
  - The ASK is subjective; difficult for a machine to detect automatically.
- **No formal retrieval mechanism:**
  - Unlike Boolean or vector-space models, ASK doesn't tell the system how to rank documents.
- **Depends on user self-awareness:**
  - Users must recognize their knowledge gaps, which is not always possible.



In spite of that it is used in Adaptive learning systems can assess a student's ASK and provide personalized learning resources and in interactive search engines and as Research support tools that help the scholars explore literature when they only vaguely know what they are missing.

**Table 1: Comparison of Different Models**

Model Name	Approach	Components	Applicability
Wilson's Model (1981, 1996)	Holistic & Behavioral	Information need, seeking behavior, intervening variables (psychological, social, environmental), information use	Widely used foundational model; suitable for studying information behavior in social sciences, libraries, and everyday contexts
Ellis's Model (1989)	Behavioral & process-oriented	Activities such as starting, chaining, browsing, differentiating, monitoring, extracting	Useful for studying researchers' and academics' information-seeking patterns
Kuhlthau's Information Search Process (ISP) Model (1991)	Cognitive & affective	Six stages: initiation, selection, exploration, formulation, collection, presentation; emotions, thoughts, actions	Highly applicable in education, library instruction, and student research behaviour
Dervin's Sense-Making Model (1983)	Cognitive & constructivist	Situation, gap, bridge, outcome; focus on meaning-making	Effective for user-centered research, communication studies, and understanding individual perspectives
Taylor's Model of Information Need (1968)	Cognitive & user-centered	Four levels of information need: 1) Visceral need, 2) Conscious need, 3) Formalized need, 4) Compromised need	Useful for reference services, understanding user-librarian interaction, and query formulation
Belkin's Anomalous State of	Cognitive & problem-oriented	Information need arises from an	Applied in information retrieval



Knowledge (ASK) Model (1980)		anomaly or gap in knowledge; users cannot fully express needs as queries	(IR) system design and interactive search systems
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Collectively, these models demonstrate that information seeking is a complex, iterative, and cognitively driven process rather than a simple search activity. While Wilson and Ellis explain behavioral patterns, Kuhlthau and Dervin emphasize cognitive and emotional aspects. Bates highlights the dynamic nature of searching, whereas Taylor and Belkin focus on the articulation and underlying causes of information needs. Together, these models provide a comprehensive framework for understanding information-seeking behavior across academic, professional, and everyday contexts.

### 7. Verification of Objectives of the Study

- To identify and analyze major models of information seeking behavior proposed by leading researchers.  
Various models have been discussed under heading 6.1 to 6.7 which gives developmental and evolutionary study of some of the important models.
- To compare different information seeking behavior models based on their approaches, components, and applicability.  
Same is discussed under 6.1 to 6.7.
- To evaluate the relevance of classical information seeking behavior models in contemporary digital information environments.  
Classical and modern models of information seeking are discussed under table 1.
- To explore recent trends and developments in information seeking behavior research.  
Classical and modern models of information seeking are discussed under table 1. Further, table 2 presents development of various models.
- To highlight the implications of information seeking behavior models for information system design and library services.  
These are discussed below in heading 8.
- To examine the concept of information seeking behavior and its significance in Library and Information Science.  
These are discussed below in heading 8.
- To suggest an integrated approach for understanding user information seeking behavior in modern information environments.  
On the basis of table 2, it can be concluded that various models are in vogue but Belkin's Anomalous State of Knowledge (ASK) Model (1980) seems to be better in present days environment.

### 8. Information Seeking Behavior in LIS

Information seeking behavior refers to the purposive actions undertaken by individuals to acquire information in response to a perceived information need. It includes activities such as searching, browsing, consulting sources, and interacting with information



systems. Information seeking behavior is closely related to, but distinct from, broader concepts such as information behavior and information use.

- Information behavior encompasses all human behavior related to information.
- Information seeking behavior focuses specifically on active information pursuit.
- Information searching behavior refers to interactions with information retrieval systems.

Information seeking behavior is significant in LIS for several reasons:

- User-Centered System Design: Understanding user behavior helps librarians and system designers create more effective information systems.
- Collection Development: Knowledge of user needs guides resource selection.
- Reference and Information Services: Enhances the effectiveness of reference interactions.
- Information Literacy Programs: Supports the design of user education initiatives.
- Digital Library Development: Informs interface design and usability improvements.

Thus, ISB serves as a theoretical and practical foundation for LIS research and practice.

### 9. Scope and Limitations of the Study

The scope of the study is limited to well-established and widely cited models of information seeking behavior, including those proposed by Wilson, Kuhlthau, Ellis, Dervin, Bates, and others. The study focuses on understanding these models in relation to academic and digital information environments.

As the study is based on secondary sources, it does not include empirical data collected from users. Therefore, the findings are dependent on the availability and interpretation of existing literature. Despite this limitation, the study provides valuable theoretical insights into information seeking behavior.

### 10. Conclusion

Information seeking behavior is a complex, multidimensional phenomenon that cannot be fully captured by any single theoretical framework. The analysis of prominent models—Wilson's Model, Kuhlthau's Information Search Process, Ellis's Behavioral Model, Dervin's Sense-Making Model, and Bates' Berrypicking Model—demonstrates that each offers valuable insights into different aspects of how individuals interact with information. While some models emphasize cognitive processes, others highlight emotional, social, or contextual influences, reflecting the intricate interplay of factors that shape information behavior. In contemporary digital environments, where information is abundant, dynamic, and often unstructured, these models remain relevant, but their application requires adaptation to the unique characteristics of digital information systems.

The study underscores the necessity of an integrated, holistic approach that synthesizes multiple models, enabling researchers, librarians, and information system designers to better understand and anticipate user behavior. By combining theoretical perspectives, stakeholders can create more responsive, user-centered digital environments that support effective information discovery, decision-making, and knowledge creation.



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