Chapter 2
Information Seeking

Abstract This chapter introduces the concept of information seeking, along with various theoretical models and conceptual frameworks. The act of seeking information is seen as one that is fundamental to human behavior, and because of that, information seeking is conceptualized with respect to a person and their needs, irrespective of any system or the availability of any information. To put information seeking in perspective, it is shown as a subset of information behavior, which incorporates any and all kinds of interactions people have with information. On the other hand, information retrieval is seen as something more specific and system-oriented. A number of foundational models of information seeking are reviewed here, followed by a description of a set of models derived from those foundational works. These models consider the motivations behind seeking information, the nature of the information sought, and the context in which this process occurs. Several of these models also identify stages or steps of a typical information seeking process. The chapter finishes with a recognition that most times information seeking is studied considering an individual, disregarding social and/or collaborative aspects of information seeking.

2.1 Introduction

It is an understatement to say that we live in an Information Age. Information, however one defines it, has become a critical element of our survival and advancement. Ford [9] compares it to nourishment and argues that just as we have nutrition science and a food and drug administration, we ought to approach people's production and consumption of information with equitable curiosity and comprehensiveness.

Seeking information, however, is not a new form of behavior. From the very beginning of our existence, we have sought information on topics such as how to make a fire or how to find shelter from natural elements. In fact, one could claim that humans' natural curiosity and desire to satisfy that curiosity by obtaining new information make us who we are now: a knowledge society. Sure enough, Marchionini [19] defines information seeking as a process in which humans purposefully engage in an activity to change their state of knowledge.
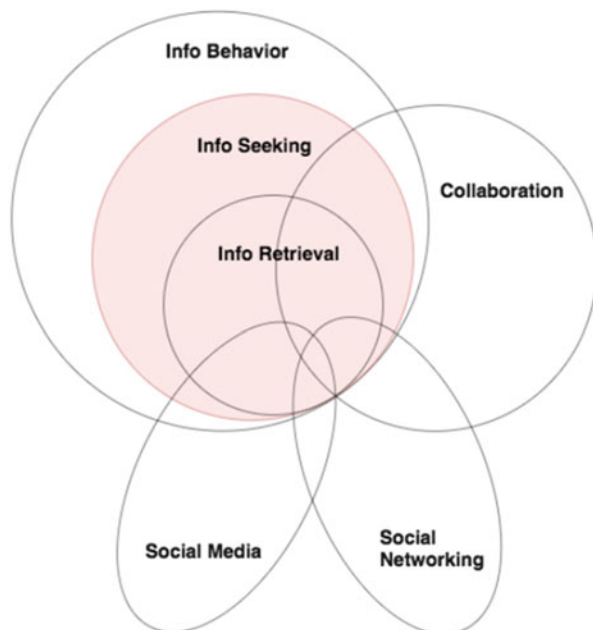
Fig. 2.1 A schematic view of information seeking and related concepts in context

Looking around, one can find a number of related concepts in the literature, including information behavior and information retrieval. So let's put things in perspective before we dive deeper. Figure 2.1 shows a conceptual link among these concepts.

As shown, information behavior is the most general and encompassing concept. It refers to all kinds of situations where people interact with information. And that's just about everywhere! Think about looking at your watch to find out what time it is. Think about picking up a book and skimming through it to decide if you want to purchase it. Think about the time when you looked up directions to a park, then checked the weather to determine if you needed an umbrella for your visit. From reading books to browsing online, and from asking for directions to making sense out of our phone bills, we are constantly interacting with information. In other words, information behavior covers a whole range of human behaviors and activities that involve information in some shape or form.

Information seeking, on the other hand, is a more specific kind of activity within that wide spectrum of behaviors. It refers to "a conscious effort to acquire information in response to a gap in [our] knowledge" [2, p. 5].

So what's in information behavior that's not in information seeking? In addition to scenarios in which individuals actively seek information, information behavior also covers situations where one is passively engaging in information interactions—such as that example of skimming through a book, or an incident of encountering

new information without asking/looking for it. Information seeking, on the other hand, requires intentionality.[1]

And now we come to information retrieval (IR). It is a subset of information seeking behaviors and processes that deals with finding information through various tools and techniques. That may seem like information seeking, but there is an important difference. Information seeking makes no assumption about the information's existence; instead it refers to the process of looking for information. IR, on the other hand, assumes that there is specific information that one is looking for and focuses on methods for ensuring the retrieval of that information. Examples of these methods are searching, browsing, and filtering.

This process of information seeking goes beyond simply retrieving information; it is usually associated with higher-level cognitive processes, such as learning and problem solving [18]. Dervin and Nilan [5] provide a different framework for information seeking. They emphasize communication and the needs, characteristics, and actions of the information seeker as opposed to mere representation, storage, and retrieval of information. We talk about *seeking* the meaning of life; whether we *retrieve* it or not, that's a different question!

In this chapter, we won't be limited to information retrieval, and also won't go as high as information behavior. Information seeking will provide us a nice middle ground to talk about some important issues. Within the study of information seeking, several models have been proposed to understand and explain the information seeking process and information seeking behavior. These models may apply to specific domains, build on foundational concepts, fit within preexisting information seeking frameworks, or present original perspectives through which information seeking can be studied. And so, our discussion in this chapter will start with some of the foundational models, and then move to those models that are built on top of these foundational models.

2.2 Foundational Models

A number of information seeking researchers developed core theories of individuals' search processes. The following subsections introduce each model, many of which continue to provide foundational material for recent and emerging literature.

2.2.1 Dervin

Dervin [4] recognized that information seeking is a problem-solving technique, and the problem in question is a situation, a gap in one's knowledge, or a desire to

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[1]Of course, scholars don't completely agree on this.

achieve a goal by using some information. Therefore, she presented a model with three phases of users facing and solving their information problems:

1. *Situation*. This phase establishes the context for the information need.
2. *Gap*. Users often find that, given a situation in this phase, there is a gap between what they understand and what they need to make sense of in their current circumstances.
3. *Use*. In this final phase, the gap is realized and manifested by questions or queries. The answers to those questions are put to use, thus allowing the user to move on to the next question.

Dervin's "situation-gap-use" model posits that information needs stem from a "situation" that creates a "gap" in a user's knowledge. This gap can be filled by a variety of tactics, or "uses." For example, Reinhard and Dervin [23] studied how novices made sense of four media technologies to analyze the complexity of media reception situations, how they converge and diverge, and how they involve multiple potential influences on media reception outcomes. They examined the situated processes involved in bridging gaps found in users' knowledge of new technology programs, such as virtual gaming and social worlds. The authors combined an experimental framework that controlled the parameters of engagement with qualitative interviewing methods to analyze users. Through their results, Reinhard and Dervin were able to study how participants engaged with new virtual worlds without reducing their analysis to merely the structural differences between platforms or the users' observable external characteristics. According to Dervin, information needs are best understood by examining the process that individuals employ to fill their respective knowledge gaps.

2.2.2   Belkin

While Dervin cared about understanding one's situation (past and present), Belkin [1] took a cognitive approach and proposed a model of information seeking that focused on information seekers' anomalous states of knowledge (ASK). This model stems from a user's knowledge gap (or "anomaly") and the need to fill it. Belkin developed this model based on his hypothesis that users of search systems are often unable to fully articulate their information needs. This leads them to miss vital components of their queries, and thus retrieve inaccurate or incomplete results. Belkin believed it was better for users to describe their anomalous states of knowledge than to formulate specific requests within a system.

In Belkin's study [1], the information seekers did not have a clear understanding of the problem they tried to solve nor the information needed to do so. Information seekers had to go through a stage of articulating their search request, and the search system helped to refine that request. Thus, the ASK model recognized that information retrieval is an iterative process, as users repeatedly returned to the IR

system to satisfy their needs. ASK served as a theoretical basis for the design of interactive, user-centered information systems.

2.2.3 Ellis

Ellis [6], one of the pioneers in the early days of information seeking research, took a behavioral approach to study information retrieval system design. He broke information seeking patterns into six characteristics: starting, chaining, browsing, differentiating, monitoring, and extracting. The six stages can be defined as follows:

1. *Starting*. This characterizes the steps taken during an initial search for information, such as identifying potential sources.
2. *Chaining*. This characterizes the steps taken while following new directions established through those sources identified during starting. Backward chaining involves following references from an initial source and is a well-established research practice. Forward chaining follows sources that refer to an initial source.
3. *Browsing*. This characterizes the steps taken after sources have been located. It is semi-directed search activity.
4. *Differentiating*. This characterizes the steps taken after a sufficient amount of content has been gathered. Searchers select pertinent resources from their findings based on measures such as the subject and quality of information.
5. *Monitoring*. This characterizes search strategies that take place after initial inquiries. Users keep abreast of developments in their research area by following identified relevant sources, which differ from subject to subject.
6. *Extracting*. This characterizes retrospective searching, in which users systematically work through a resource to identify important information.

Ellis describes these stages in relation to retrieval system facilities and considers implementing an experimental system in a hypertext environment. Two additional stages of information seeking behavior—verifying and ending—were reported in Ellis et al. [8] as part of a model based on empirical research that has been tested in many domains, including a run in the context of an engineering company [7].

2.2.4 Wilson

Wilson [27] presented a model of information seeking processes that demonstrates how Ellis's work [6] could be incorporated into a general model of information behavior that applies to fields outside information science. This problem-solving model posits that the root of problematic information seeking behavior is the concept of "information need," which is subjective to each respective searcher and not directly accessible to an observer. The experience of an information need, then,

can only be characterized by deductive observational reasoning or through user reports. Wilson [27] applies his theories on information seeking to the health-care industry, stating that its emotional impact serves as an activating mechanism that necessitates search strategies that fit within a stress/coping framework, as developed by Miller and Mangan [21]. Wilson's activating mechanism fills the "gap" between the "situation" and "use" that Dervin [4] identified.

Wilson's study identified three major intervening variables in the information seeking process: personal characteristics, which include emotional variables, educational variables, and demographic variables; social/interpersonal variables; and environmental variables, which can be divided into economic variables and source characteristics. Wilson's [27] model identifies four potential modes of information seeking:

1. *Passive attention.* Information seeking without intention, such as watching television.
2. *Passive search.* Occasions where one type of search results in information that happens to be relevant.
3. *Active search.* An individual actively seeks information.
4. *Ongoing search.* Active searching has established a framework of knowledge and/or ideas, but occasional continuing search is carried out to update or expand that framework.

2.2.5   Kuhlthau

Kuhlthau [14, 15] supplemented Ellis's work by attaching what she called information search process (ISP)—or associated feelings, thoughts, actions, and appropriate information tasks—to the stages of information seeking. ISP focuses on user traits such as thoughts, feelings, and actions rather than system-oriented information. The ISP model's six stages incorporate affective (feelings), cognitive (thoughts), and physical (actions) aspects exhibited by actual library users in a series of five field studies. Each stage also includes an appropriate task that will progress users to the next stage.

1. *Initiation*. Initiation occurs when a user becomes aware of their lack of knowledge or understanding. Uncertainty and apprehension are common, and thoughts focus on contemplating and comprehending the problem. Users must recognize the need for information, and may discuss possible topics and approaches.
2. *Selection*. Selection occurs when a user must identify their general topic to investigate or approach to pursue. Feelings of uncertainty give way to optimism, other users may be consulted, and thoughts center on weighing potential topics against constraining factors, such as personal interest and time.
3. *Exploration*. Exploration occurs when a user must investigate general information on a topic to increase their personal understanding. Thoughts center on becoming informed and oriented enough to articulate a point of view.

Communication between a user and a system may be awkward due to the user's inability to precisely express their information need. Feelings of confusion, uncertainty, and doubt arise.

4. *Formulation*. Formulation is the turning point in ISP. It occurs as users must form a focus for the information they encountered. Thoughts involve identifying and selecting ideas from which to form a focused perspective. This typically occurs gradually and brings an increased sense of confidence.

5. *Collection*. Collection characterizes the time in which interactions between the user and the system function most effectively and efficiently. The task involves gathering information related to the focused topic. Thoughts revolve around defining, extending, and supporting the focus, while actions involve selecting relevant information and making detailed notes. Confidence increases while uncertainty subsides.

6. *Presentation*. Presentation brings relief and satisfaction if the search has gone well, or disappointment if it has not. The user must complete their search and present or otherwise use their findings. Thoughts center around a personalized summation of the topic.

As Kuhlthau drew on Ellis's model to develop ISP, Wilson [28] presented a comparison of Ellis's and Kuhlthau's models, stating, "[...] [T]he two models are fundamentally opposed in the minds of the authors: Kuhlthau posits stages on the basis of her analysis of behaviour, while Ellis suggests that the sequences of behavioural characteristics may vary" (p. 256).

2.2.6   Westbrook

Using the work by Belkin, Dervin, Ellis, and Kuhlthau as reported above, Westbrook [26] proposed a model that redefined information seeking stages in order to reflect users' broad range of needs. Her set of actions includes needing, starting, working, deciding, and closing.

1. *Needing*. Westbrook compares needing to a hologram that a user walks around and through but may have difficulty verbalizing. Referencing Belkin, Kuhlthau, and Taylor, Westbrook views the action of needing as crucial, ambiguous, and evolutionary.

2. *Starting*. Though an initial start must be made, Westbrook believes there is no consensus among researchers regarding that start, however brief it may be. She believes it is the point at which a user moves beyond conceptualizing a need and determines a means to fulfill that need.

3. *Working*. Because the working process can constantly alter every aspect of an information need, it is the most complex and cyclical of Westbrook's stages. Every aspect may involve making a decision regarding the status of a need.

4. *Deciding*. Whether users locate their desired information or give up on their need, they will decide to discontinue their search at some point. Depending on the

decision, further action may or may not be required. Westbrook believes that her preceding literature missed this crucial step.
5. *Closing*. Closing may be the least common of the five actions and can take many forms. Academics may compose papers or presentations, while other users may have a personal need to wrap up an experience through a conversation with a librarian or friend.

In Westbrook's purview, these five actions encompass all preceding relevant research in user needs. User activities may include some or all of the stages in any order with any number of reiterations. In terms of system design, Westbrook calls for communications-based systems that help users inform themselves, create their own order, and cope with their own needs, as opposed to systems that collect, store, retrieve, and deliver one "right" answer.

2.2.7   Marchionini

Marchionini [20] presented another problem-solving approach to information seeking. His model seeks to understand search processes in an electronic environment in which information seeking depends on several interacting factors: information seeker, task, search system, domain, setting, and search outcomes. Marchionini sees the information seeker as the center of this process and believes that information seeking is composed of eight subprocesses which develop in parallel: (1) recognize and accept an information problem, (2) define and understand the problem, (3) choose a search system, (4) formulate a query, (5) execute search, (6) examine results, (7) extract information, and (8) reflect/iterate/stop.

1. *Recognize and accept an information problem*. This aligns with Dervin's "gap" and Belkin's "anomaly" and can be internally or externally motivated. Here, the user becomes aware of an information problem and, if deemed appropriate, accepts it and begins to define it for a search. This initiates problem definition but is largely ignored by system designers who narrowly view it as a user-specific process. Marchionini believes that systems that support interaction and engagement lead users to more readily accept their problems.
2. *Define and understand the problem*. This critical step remains active as long as the information seeking progresses. Most subsequent subprocesses transition back to this stage at some point. Cognitive processes identify key concepts and relationships that lead to a definition of the problem that is articulated as an information seeking task. This can be influenced by knowledge of the task domain and setting. The problem must be limited, labeled, and framed.
3. *Choose a search system*. This depends on the user's previous experience with their topic, scope of their information infrastructure, and expectations of an answer. The type of task and characteristics of various systems are taken into account. In practice, several systems are consulted throughout the process.

These are not only electronic; reference librarians, for example, are considered "systems."

4. *Formulate a query*. This involves matching the task with the chosen system. Typically, the first query string serves as an entry point into the system and is followed by browsing and/or query reformulations. *Semantic mapping* involves the user's own vocabulary's ability to generate content, while *action mapping* involves the strategies and tactics deemed best for fulfilling the task within the rules of a particular system.

5. *Execute search*. The physical actions needed to conduct an information search depend upon the user's mental model of a particular system. This stage is based on the semantic and action mappings that occur during query formulation. Electronic platforms have revolutionized execution, as they reduce the physical actions required for an information need's resolution.

6. *Examine results*. A system's response to a query must be analyzed by the user, who should assess progress toward completing their task by judging the quantity, type, format, and relevance of retrieved results. Expectations often shift throughout the process and are typically determined by the information need and the user's personal information structure.

7. *Extract information*. Assessments about relevance cause information to be extracted. If a document is deemed relevant, the user may immediately extract and save information or may continue to examine other results and later reexamine the document in light of new or different findings. Extracted information is manipulated and integrated into an information seeker's knowledge of their task's domain. A document's perceived relevance can be revised throughout the search process.

8. *Reflect/iterate/stop*. Typically, an initial retrieved set of documents serves as feedback for further query formations and executions. Users should monitor their progress and assess how well their tactics and retrieved information map onto their task. A stopping point may depend on external functions, such as a system's availability, or internal functions, such as motivation or ability.

The various frameworks and models presented in this section demonstrate the multifaceted nature of information seeking and information seeking behavior, as well as the rich research landscape that surrounds the subjects.

2.3 Models Built on Foundational Models

Rather than focus on specific domains, some theorists expand upon classic information seeking models to develop new or updated general theories. Considering the current rapid pace at which information is produced and disseminated through a near-infinite number of channels and sources, these modern theories shed important light on users' ability to satisfy their information needs. The following demonstrate how foundational models can apply to more modern contexts.

2.3.1   Expanded ISP

David et al. [3] proposed a multistep process built upon Kuhlthau's [14] infor-
mation search process (ISP) that examines the process of information seeking in
hyperlinked environments. Their model is ideally suited for information seeking
situations in which goals are emergent. They developed a cyclical model to examine
the relationships among perceived goal difficulty, goal success, and self-efficacy.
The study examined the emergent properties of information seeking in hyperlinked
environments using self-efficacy as a mediating mechanism and intrinsic motivation
as a moderating factor.

The authors focused on a broad conception of information seeking behavior to
develop a general framework that captured directed and semi-directed information
seeking. Their model combines goal-setting theory (or the idea that human behavior
is motivated by goals) with self-efficacy in information seeking, motivational fac-
tors, and—most fundamentally—the information seek cycle (ISC) initially proposed
by Fredin and David [11]. ISC consists of three stages:

1. *Preparation*. When a user prepares to make choices from a menu of links in a
   hyperlinked system
2. *Exploration*. When a user navigates and explores their choices' results and
   processes the information
3. *Consolidation*. When a user evaluates the results against the goals they set during
   the preparation stage

After testing their model on 42 undergraduate students who were assigned a
specific search task, researchers drew the following conclusions based on ISP and
ISC:

1. Perceptions of goal difficulty carry forward from one stage to the next.
2. Goals perceived to be more difficult at the beginning of a cycle are less likely to
   be achieved.
3. Success did not significantly affect future cycles' information goals, but operated
   mainly through confidence.
4. While increased confidence within a cycle led users to believe the information
   goal would be easier, the previous cycle's lingering confidence seemed to
   encourage users to increase the difficulty of their goals.
5. Initial intrinsic motivation had a moderating effect on the link between success
   and confidence.

Ultimately, the study captured the dynamic shifts in goal constructs and related
psychological processes involved in information seeking. But perhaps more signifi-
cantly, it integrated other scholars' relevant theories and created an empirical test of
the overarching framework of cyclical information seeking.

2.3.2   Information Seeking and Communication

Robson and Robinson [24] built on existing models of information seeking behavior to develop a model that encompassed both information seeking and communication. They hoped to identify key factors affecting communication and the use of information in order to create a practical model for both information providers and users.

The literature uncovered during this study demonstrated a divide between information seeking research concentrated in library and information science (LIS) and work done in the wider field of communication. While commonalities exist, LIS research focused on information and its user while communications research focused on the communicator and the communication process. The model proposed by Robson and Robinson [24] combined key elements from both fields to account for both an information seeker and a communicator or information provider.

In their review of information science research, Robson and Robinson [24] referred to Ellis, Kuhlthau, and Wilson. However, preexisting scholarship lacked any insight into communication as part of information behavior, and thus did not account for the following significant concepts:

1. Context
2. Demographics
3. Expertise
4. Psychological factors such as perception, self-efficacy, and cognitive dissonance

By combining information seeking research with concepts from communication, Robson's and Robinson's study developed a novel information seeking and communication model (ISCM). Both information users (including information seekers and those with information needs) and information providers or communicators (including authors, publishers, and Websites) operate within various and intersecting situational contexts that motivate information seeking behaviors and assessments. Interaction between searchers and communicators is necessary during this process. This fresh take on information seeking provides insight into searching behaviors and the importance of the utility and the credibility of information and its sources.

2.3.3   Mediated Information Retrieval

Using observational and longitudinal data collected in the United States and United Kingdom, Spink et al. [25] investigated the process of mediated information retrieval searching during human information seeking episodes to characterize aspects of that process, which included information seekers' changing situational contexts, information problems, uncertainty reduction, successive searching and cognitive styles, and cognitive and affective states.

Their research approach is embedded in a theoretical framework that draws on previous IR and human information behavior (HIB) studies. Drawing on Wilson and Belkin, Spink et al. [25] aimed to integrate both fields to further the development of future models that should account for Web and IR system design and evaluation. In particular, they examined interactive search episodes to study how shifts take place during and between searches over time. These shifts include changes in tactics, the definition of the information problem, strategies, terms, goal states, uncertainty, and feedback. Time, problem-solving processes, information seeking episodes, uncertainty, cognitive styles, interactive search sessions, and successive searching behaviors were also examined to investigate human information seeking and searching processes in mediated online searching environments. The authors related these variables to the work of other researchers such as Kuhlthau and Ellis.

The actual theoretical framework consists of a set of situated actions within interactive search episodes over a period of time that can be represented as human information seeking stages and successive searches. According to Spink et al. [25], these successive interactions can be integrated with Wilson's [28] theoretical framework to indicate steps along a problem-solving process. An analysis of these episodes could impact system design and design criteria through implications that concern graphic displays and interactivity of IR systems, which would facilitate research. Above all, this framework focuses on a larger picture that embraces information seeking and information searching and draws together major concepts (e.g., interaction and time) to integrate existing and future IR and information seeking models.

2.3.4 Emerging Concepts: Sense-Making and Multi-Session IR

First applied to information science by Dervin [4], sense-making draws on existing theories to consider how users attempt to make sense of uncertain situations. This could include how they interpret information to use for their own information-related decisions, and how they make sense of words in their own language. Qu and Furnas [22] advocated for a model-driven approach where existing user behavior models were used to inform the evaluation process. While their theory belongs to a family of formative, user-centered evaluation methods, it focused more on users' processes than specific system design. This allowed for a better understanding of the interaction between users and systems, as well as a discovery of the missing components in existing designs. Qu and Furnas [22] presented how a sense-making model informed a formative evaluation of a basic exploratory search system.

Zhang and Soergel [29] proposed a model that's framework analyzed and described cognitive processes and mechanisms involved in individual sense-making. They focused on changes to conceptual space and cognitive mechanisms used in achieving those changes. Their paper reviewed and extended existing sense-making models with ideas from learning and cognition. Sense-making models in human-computer interaction (HCI); cognitive system engineering; organizational

communication; and LIS, learning theories, cognitive psychology, and task-based information seeking received special attention. The model resulting from that synthesis created a stronger basis for explaining sense-making behaviors and conceptual changes. It also illustrated the iterative process of sense-making.

Multi-session information seeking exemplifies another framework that expands upon older IR models, and can involve multistep information seeking processes, collaborative information seeking (CIS), and/or the systems that foster these interactions. Several theorists have developed models rooted in this concept.

Lee et al. [16] conducted a detailed walk-through of similarities between the "creative process" and the behavioral model of information seeking. They systematically analyzed and compared each stage in the "creative process" with "activities" in the behavior model of information seeking, and established links where similarities were found. Four common links were established: preparation, incubation, illumination, and verification. The researchers concluded that the type of information seeking task may have an impact on the extent to which an information seeker exhibits all stages of the model. In other words, depending on the type of task, the extent or way in which information seekers exhibit proposed stages in creative information seeking may be different.

Foster [10] offered a nonlinear model of information seeking behavior, which contrasted with earlier-stage models of information behavior and represented a potential cornerstone shift toward a new perspective for understanding user information behavior. The paper offered four main implications of the model as it applied to existing theories, required future research, and could develop information curricula. Central to these implications was the creation of a new nonlinear perspective from which user information seeking could be interpreted.

Lin and Belkin [17] proposed a model called multiple information seeking episodes (MISE), which consisted of four dimensions: problematic situation, information problem, information seeking process, and episodes. MISE explained successive search experiences for essentially the same information problem.

Kari and Savolainen's [12] theoretical paper proposed a contextual model of Web searching from an individual's perspective based on holistic reflection and earlier literature. The framework included various layers: lifeworlds, domains, situations, action, information action, information seeking, information sources, Internet, and Web. Together, they formed the dynamics of the entire creation. The researchers claim that the framework amounts to an exhaustive description of the context of Web information seeking, and that the theoretical construct can be taken advantage of when researching information seeking from practically any source.

Karunakaran et al. [13] offered collaborative information behavior (CIB) as an umbrella term to connote the collaborative aspects of information seeking, retrieval, and use. With findings from past studies conducted by their research team and other researchers, the authors provided the contours of a CIB model. They conceptualized CIB as comprised of a set of constitutive activities organized into three phrases: problem formulation, CIS, and information use. We will revisit this idea of CIB and CIS in Chap. 6.

2.4   Summary

Information seeking is one of the most fundamental attributes of human behavior. It's a combination of human curiosity and consciousness. These particular attributes have allowed us to invent life-sustaining tools and techniques, discover methods for survival and progress, and advance from Stone Age to Information Age. In this chapter, we reviewed information seeking as a concept primarily studied in the fields of information science and IR. We saw that information seeking is a subset of information behavior, but more general than IR. But just like many other theoretical concepts, you can be forgiven for mixing one term with another. Scholars who do fabulous work in IR may also be making significant contributions to information seeking and vice versa. And so, unsurprisingly, the models and methods we reviewed in this chapter had overlaps among information behavior, information seeking, and IR. We learned that most of the models recognize the need for seeking information—whether it's called *need*, *gap*, or *anomalous state of knowledge*. Most of them also identify phases or stages in one's information seeking process, and almost all of them start and end with a human. After all, information seeking is about focusing on a person rather than the system/resources.

What is often striking to some scholars is that all of these models assume an individual information seeker. But in reality, we find many situations in which people are seeking information *through* and/or *with* other people, the former being a social information seeking situation and the latter being a collaborative information seeking scenario. In other words, while the models described in this chapter do a fine job of explaining individual information seeking processes, they tell us little to nothing about those social and collaborative situations. At best, they try adding social and collaborative steps as a new layer or a factor of information seeking. But that's quite ad hoc, and those who greatly care about social and collaborative aspects of information seeking, including myself, argue that we need to study such situations in a more holistic way and not as an afterthought. And so we will revisit these two concepts in the later chapters when we talk about social Q&A, social search, and collaborative information seeking, as well as their combination as social and collaborative information seeking.

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