

# UNDERSTANDING HUMAN INFORMATION BEHAVIOR

When, How, and Why  
People Interact  
with Information

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To the many undergraduate students who inspired us to write this book. It is a pleasure and a privilege to teach the next generation of information professionals, and we hope that this book—in some small way—contributes to their future success.

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## *Acronyms*

AALL	American Association of Law Libraries
ACMA	Association for Computing Machinery
ACRL	Association of College & Research Libraries
ALA	American Library Association
APA	American Psychological Association
ASIS&T	Association for Information Science & Technology
ASK	Anomalous State of Knowledge
CMIS	Comprehensive Model of Information Seeking (model)
CSA	Computer and Information Systems Abstracts
DLIST	Digital Library of Information Science and Technology
E-LIS	E-Prints in Library & Information Science
ELIS	Everyday Life Information Seeking (model)
ERIC	Education Resources Information Center
ESL	English as a Second Language
FCC	Federal Communications Commission
IB	Information Behavior
ICDL	International Children's Digital Library
ICTs	Information and Communication Technologies
IMLS	Institute of Museum and Library Services
INSU	Information Needs, Seeking, and Use
IRB	Institutional Review Board
ISP	Information Search Process (model)
JASIS&T	Journal of the Association for Information Science and Technology
LEP	Limited English Proficiency
LGBTQ+	Lesbian, Gay, Bisexual, Transgender, and

	Queer/Questioning and others
LIS	Library and Information Science
LISA	Library and Information Science Abstracts
LISTA	Library, Information Science, and Technology Abstracts
MLA	Modern Language Association
MLIS	Master of Library and Information Science
MLS	Master of Library Science
NAAL	National Assessment of Adult Literacy
NDIA	National Digital Inclusion Alliance
NLM	National Library of Medicine
NTIA	National Telecommunications and Information Administration
RUSA	Reference and User Services Association
SCONUL	Society of College, National, and University Libraries (UK and Ireland)
SES	Socioeconomic status
SNSs	Social networking sites
UGC	User-generated content
UMD	University of Maryland
UX	User experience
W3C	World Wide Web Consortium
WCAG	Web Content Accessibility Guidelines
WHO	World Health Organization

## Preface

As we write *Understanding Human Information Behavior: When, How, and Why People Interact with Information*, we are in the midst of the COVID-19 pandemic, with misinformation and disinformation (misinformation communicated with an intent to deceive people) rampant in many spaces, particularly on social media sites. The current situation is a stark reminder of how people's behavior with regard to information often has significant (and sometimes dire) consequences for their ability to make well-informed decisions and for the potential and actual outcomes of their decisions. Some folks have acted on rumors with no basis in medical fact in an effort to prevent or cure the virus. Some of these rumors, such as drinking warm water with lemon (as touted on Facebook), are harmless. But, others – such as President Trump's ruminations that perhaps injecting or otherwise ingesting disinfectants such as bleach could kill the virus – have been dangerous and, in some cases, lethal. For example, approximately 800 people have died and nearly 6,000 people have been hospitalized after acting on a rumor that drinking methanol can cure the virus (Coleman, 2020). The current glut of COVID-19–related information available to us – much of it false – has been called an “infodemic” by the World Health Organization. The sheer quantity of information available, combined with the prevalence of misinformation and disinformation, makes it very difficult for people to find trustworthy information. It has been suggested that the infodemic is such a serious problem that it may be even more dangerous than the pandemic itself.

In this introductory textbook, we focus on the very important topic of information behavior – that is, how people behave (or don't behave) with regard to information. Information behavior

encompasses a very wide range of information-related activities. In fact, think of any verb and add information – that is information behavior! The most frequently studied and discussed types of information behavior include needing, seeking, and using information; however, these are just a small subset of people’s interactions with information. Information behavior also encompasses situations in which people do not interact with information, such as when they don’t need (or don’t know or believe that they need) information, when they don’t seek information (and, relatedly, when they actively seek to avoid encountering information on some particular topic), and when they have information but do not act on it.

An understanding of information behavior is crucial for all types of information professionals. Our intended audience for this textbook is undergraduate students who are majoring in information science, human-computer interaction, information design, information management, information systems, information technology, education, cognitive psychology, and other related subjects. Our overarching goal for writing this book is to provide students who are new to the field with a firm grounding in information behavior, taking an applied approach and explicitly linking our content to the types of careers that students in these majors/programs are likely to pursue (and the specific job roles and responsibilities they are likely to have) within the information professions.

At some point in your career, you will likely need to assess the information needs, information-related preferences, and information-seeking habits of your actual and intended users/patrons. Knowing how to do this effectively will optimize your ability to prevent and/or to lower the barriers these folks face in trying to access and use information that is trustworthy, actionable, and relevant to their information needs. In a nutshell, our purpose in writing this book is to help prepare you to be the most helpful information professional you can be!

All three authors of this book are faculty members at the University of Maryland College of Information Studies, also known as the *UMD iSchool* (<https://ischool.umd.edu>). We teach courses to

undergraduate students in our BSIS (Bachelor of Science in Information Science) program (<https://ischool.umd.edu/academics/bachelor-of-science-in-information-science-college-park>), including *Introduction to Information Science*, User-Centered Design, and Information User Needs and Assessment. Teaching the latter course motivated us to write this book, as we were unable to find an introductory text on information behavior that both targeted undergraduate students and took a more applied approach. Each of us authors also conducts research on topics related to information behavior. Elizabeth Bonsignore researches participatory approaches and methods that include users in the design of information systems and technology-based learning experiences (Chapter 11), with a focus on youth (Chapter 14). Beth St. Jean researches people's health-related information behaviors, aiming to uncover and address information-related factors (such as a lack of information access and/or inadequate health literacy) that can contribute to health disparities and health injustice (Chapter 13). Ursula Gorham researches people's legal information behaviors, particularly focusing on issues relating to access to justice (Chapter 15).

This textbook is comprised of seventeen chapters which advance from providing the fundamental building blocks of information behavior and introducing related concepts to exploring particular application areas. The first six chapters lay the groundwork needed for a basic understanding of the world of information behavior. In Chapters 7 through 12, we focus on the various research methods that information behavior researchers and information professionals use to understand, investigate, and communicate about people's information needs and behaviors. In Chapters 13 through 16, the authors draw upon their own research areas, with each chapter focusing on a specialized context of information behavior (as described in the prior paragraph). In the final chapter of the book (Chapter 17), we discuss many of the information-related careers that students might choose to pursue, emphasizing the thread of information behavior that pervades

the roles and responsibilities that are frequently associated with each of these positions.

In **Chapter 1**, we introduce the topic of information behavior, defining the term and illustrating the concept through a set of vignettes. We then discuss the scope, evolution, and importance of both the concept and the field of information behavior. To close the chapter, we focus on people's information behaviors within the current era of the COVID-19 pandemic, pointing out some of the many very important roles that information professionals can play in the current "infodemic." Following this introductory chapter, we move to **Chapter 2: Fundamental Concepts**, where we unpack the meta-concept of information behavior, looking at its fundamental building blocks, including *information*, *information needs*, *information seeking*, and *information use*. We also look at two special types of information behavior – *incognizance* and *information avoidance* – and close the chapter with a discussion of the important roles that information behavior plays throughout the discipline of information science and across the vast array of the information professions.

In **Chapter 3: Historical Development of the Field**, we discuss the history of the field of information behavior, discussing its roots in library use and reading behavior nearly a century ago. We also highlight key patterns and trends that have emerged and contributed to the shaping of the field, including a shift from focusing on channels and sources of information to focusing on information users and their information needs, information-seeking behaviors, and their experiences with information. We conclude the chapter with a call to the reader to think about the ways in which information behavior is relevant to their other classwork and the jobs they currently have and/or the career they would like to pursue.

**Chapter 4: Related Concepts** covers important concepts that, although they are not among the building blocks that define information behavior, are intertwined with the fundamental concepts discussed in **Chapter 2**. We introduce concepts related to four areas: (1) overall information behavior environment, (2) information access, (3) information seeking, and (4) information assessment. With regard

to the overall information behavior environment, we discuss the important concepts of *context* and *situation*. Looking at an individual's (or group's) information behaviors without paying attention to their context and situation will provide a very incomplete picture, potentially leading information professionals to draw incorrect conclusions about how to best assist them. Moving to information access, we look at the concepts of *attention* (how we allocate our limited attention among competing sources/information), *information overload* (the feeling of being inundated with large amounts of information), *selective exposure* (the decisions we make regarding the information we choose to be exposed to), *selective attention* (the decisions we make regarding the information we pay attention to and the information we ignore), *information poverty* (the lack of physical and/or cognitive access to information), and *convenience* (our tendency to knowingly accept lower quality/less credible information if that's more convenient for us to access). With regard to information seeking, we look at *Zipf's Principle of Least Effort* and the related concept of *satisficing* (people frequently seek just enough information to obtain a "good-enough" answer, not necessarily the best answer). We also discuss *information encountering* and *serendipity*, two concepts that highlight the role of chance in information behavior. Next, we discuss *berrypicking* and *information foraging*, both metaphors describing the ways in which people seek information by moving from bush to bush (source to source), picking off the useful berries (information). Rounding out the information-seeking section of the chapter, we look at two special cases of information seeking – *proxy information seeking* (seeking information for someone else) and *collaborative information seeking* (seeking information with someone else). In the final section of [Chapter 4](#), we dive into information assessment, looking particularly at the topics of *relevance*, *pertinence*, *usefulness*, and *credibility assessment*.

In [\*\*Chapter 5: Information Literacy\*\*](#), we look at the set of skills people need in order to recognize and identify their information needs; articulate these needs; seek information to help fill these needs; assess the relevance and credibility of the information they

come across; and to responsibly share and make use of trustworthy information. This set of skills is called “information literacy.” In this chapter, we also look at the interrelated concepts of *digital literacy* – people’s technology-related skills that enable them (or not) to carry out work, school, or everyday-type tasks – and *fake news* (think of the rampant misinformation and disinformation one encounters on the Internet). Next, we look at some information literacy standards (Association of College and Research Libraries’ (ACRL) (2000) “Information Literacy Competency Standards for Higher Education”), frameworks (ACRL’s (2015) “Framework for Information Literacy for Higher Education”), and models (Eisenberg and Berkowitz’s (1987) “The Big6 Skills” and the Society of College, National, and University Libraries (SCONUL) Working Group on Information Literacy’s (2011) “Seven Pillars of Information Literacy”). After discussing the important ways in which an individual’s information literacy influences both their information behaviors and the outcomes that result, we conclude the chapter with a deep dive into a special type of information literacy, *health literacy*.

**Chapter 6: Digital Divide and Digital Inclusion** focuses on a specific type of barrier to information access (the *Digital Divide*), as well as efforts that are currently underway to help people overcome this barrier. The Digital Divide refers to inequalities in people’s access to information and communication technologies (ICTs), such as computers and the Internet. People who have been (and some of whom still are) on the wrong side of this divide include people who are older, who are disabled, who have lower incomes, who have less education, who are non-native English speakers, and who live in rural areas. A lack of access to ICTs compounds the disadvantages these populations face, limiting their ability to pursue education and employment and participate in our democracy. *Digital inclusion* efforts aim to ensure that everyone (including these disadvantaged populations) can access, use, and derive maximal benefit from ICTs. The chapter concludes with a call for the reader to use their education and expertise to contribute to these efforts and to the development of a more fully digitally inclusive society.

In **Chapter 7: Finding, Reading, and Critiquing Information Behavior Studies**, we first provide a general introduction to the overarching *scholarly communication system* (the system by which scholars, such as your professors and the authors of this book, share their work with one another) and the *peer review process* (how scholars vet one another's work). Next, we provide tips and tricks for finding information behavior studies, enumerating specific journals and library databases that are well known for their inclusion of such work. We then offer some tips on how to read information behavior studies, walking the reader through the usual components of articles reporting information behavior studies, including the introduction, literature review, methods, findings, discussion, and conclusion sections. Next, we discuss strategies for critiquing information behavior studies, providing tips for evaluating the qualifications of the author, the relevance and quality of the journal, and the quality and credibility of both the article and the study itself. We conclude the chapter with an example of a critique of an information behavior study – a study that one of the authors carried out and wrote up for the introduction to information behavior class she took many years before this book was written.

**Chapter 8: Research Methods** defines the terms *research* and *research design*, and then moves on to describe a wide range of methods that people use to conduct research. This chapter explores participant recruitment, data collection, and data analysis techniques. Next, we discuss the important implications of researchers' decisions in each of these areas for the quality and trustworthiness of their findings. In conclusion, we discuss *research ethics*, including the vital role of Institutional Review Boards (IRBs) in protecting the rights and welfare of human subjects who participate in research studies and the important ethical considerations that researchers need to keep in mind when designing and carrying out their investigations.

In **Chapter 9: Assessing User Information-Related Preferences and Information Needs**, we first delve further into the concept of *information need* and look at the importance of assessing people's information-related preferences and information needs before jumping

in to “help” them. We then look at some of the major guidelines that govern the work of one type of information professional whose central responsibility is to help people with their information needs – *reference librarians*. We focus specifically on Taylor’s (1968) Five Filters of Question Negotiation, Dervin and Dewdney’s (1986) Neutral Questioning, the American Library Association (ALA) Reference and User Services Association’s (RUSA’s) (2013) Guidelines for Behavioral Performance of Reference and Information Service Providers, and Kuhlthau’s (2004) Zones of Intervention. Next, we look at some of the similar techniques that system designers and software developers use in an analogous process often referred to as *user requirements analysis*. In conclusion, we look at some of the methods information professionals use to assess whether and to what extent an individual’s, group’s, or community’s information needs have been accurately identified and successfully fulfilled.

**Chapter 10: Investigating User Information Behavior** covers a sampling of ten information behavior investigations, focusing on various user groups, including students, workers, immigrants, hobbyists, voters, shoppers, and prisoners. Our goal for this chapter is to increase your familiarity with, your understanding of, and your experience with critiquing studies of user information behavior. In conclusion, we emphasize that learning more about your users’ information behavior can better enable you to design and tailor information resources, programs, services, systems, and/or platforms to this particular population. In turn, such informed design can enable you to better facilitate the efforts of users as they strive to find, assess, and make use of information.

In **Chapter 11: Connecting Information Behavior and Human-Computer Interaction: User Experience, Accessibility, and Usability**, we introduce the concepts of *user experience* (what is using product X like from the user’s perspective?), *accessibility* (can someone who is blind or who has a hearing impairment use product X?), and *usability* (how intuitive and easy-to-use is product X?). These concepts are all related to information behavior and are interrelated with one another – for example, if product X is not

accessible, it will not be usable, and both of these factors influence the user's overall experience in trying to use X. After introducing these concepts, we discuss the various types of research methods and approaches that user experience (UX) and usability professionals use in their work, as they seek to optimize the experiences of future users and assess the user experience as they make use of existing products. Next, we look at three examples where researchers have used *user-centered design* (that is, keeping the user at the center when making any design-related decisions) and *participatory design* (which entails inviting and involving users to participate in design-related decisions) methods to optimize the design of specific online resources, including a multicultural, multilingual online library; "tactile" books for blind youth; and resources to help children navigate online privacy issues and concerns. In conclusion, we underscore the importance of using user-centered and participatory design methods to ensure that user perspectives have been fully taken into account, to maximize the accessibility and usability of information products/resources for the intended users, and to optimize these users' experiences.

**Chapter 12: Information Behavior Models and Theories** first defines the terms *model* and *theory*, and then presents some of the many information behavior models and theories that researchers have developed to date. Both information behavior models and theories are simplified representations of people's information behaviors. Information behavior models tend to be depicted as diagrams, showing the stages that people proceed through as they gather (or avoid), manage, share, or use (or not) information. Theories are more complex, attempting not only to describe the stages of people's information behavior, but also to explain the reasons behind people's actions. After defining both terms, we explore some examples of information behavior models and theories that have been developed within three different user contexts – school/research, work, and everyday life. We also discuss a few examples of models and theories that are not context specific and, thus, are more general in nature. In conclusion, we illustrate the usefulness of information

behavior models and theories by describing instances where they have been used to guide and inform the practices of various types of information professionals (such as librarians, information managers, systems designers, usability specialists, and webmasters) and of researchers in information behavior and related fields.

Each of the next four chapters (**Chapter 13: Consumer Health Information Behavior and Health Justice**, **Chapter 14: Youth Information Behavior**, **Chapter 15: Legal Information Behavior and Access to Justice**, and **Chapter 16: Information Behavior in Libraries**) draws upon the authors' personal research areas, focusing on a specialized context of information behavior. In **Chapter 13: Consumer Health Information Behavior and Health Justice**, we talk about people's health-related information needs and the strategies they use to find, assess, manage, and use health information. Central to this discussion is an exploration of the profound consequences that an individual's health-related information behaviors can have for their health trajectory, their quality of life, and their potential and actual health outcomes. We also cover the important concept of *health justice* – the commitment to ensuring that every individual has sufficient and equitable access to the resources and opportunities they need to maximize their ability to live a long and healthy life. In light of the continued growth of health disparities between various populations in this country, we describe the important roles that information professionals can and do play in moving us closer to health justice. Next, we describe three examples of consumer health information behavior investigations that intersect with the concept of health justice. In conclusion, we ask the reader to consider ways in which they might contribute to a much-needed societal shift toward health justice through their current and/or future roles as information professionals.

In **Chapter 14: Youth Information Behavior**, we focus on the *information behavior of children and teens*, including preschoolers, elementary school children, middle school students, and high school students. Within each of these age groupings, we describe three examples of studies that have investigated these populations'

information behaviors across multiple contexts, including home, school, and their school or public library. In conclusion, we point out that although investigations of youth information behavior currently comprise a minority of information behavior studies, youth information behavior is a rapidly growing research area. We also emphasize that the knowledge yielded by these investigations can be leveraged to tailor the design of information resources, information literacy classes and programs, and information devices, platforms, and systems to young people's information needs, preferences, and practices.

**Chapter 15: Legal Information Behavior and Access to Justice** focuses on a specific type of *everyday information behavior that involves legal information*, as well as challenges around laypeople's (that is, people who do not have legal training) access to this type of information and even to justice itself. We begin the chapter with a discussion of *legal information literacy*, which pertains to a person's ability to understand legal terminology and to navigate the (very complex!) legal system. Next, after highlighting some of the many barriers that can arise when laypeople are trying to access legal information, we discuss several solutions that can help to address these barriers, including offering plain language materials and establishing legal information self-help centers and websites. In conclusion, we underscore the importance of conducting user needs assessments in order to optimize the design of legal information resources and services so that they effectively and efficiently fulfill people's needs.

In **Chapter 16: Information Behavior in Libraries**, we focus on *people's information behaviors within public, school, and academic libraries*. We also discuss ways in which libraries and librarians facilitate (or sometimes impede) patrons as they seek information using libraries' wayfinding systems. One particular impediment to library use – *library anxiety* – is also described. We then explore two trends related to library use – *information literacy instruction* and the *application of user experience methods to the design of library services and space*. With regard to the latter, we discuss some of the many UX methods that libraries use to assess the information

needs of their patrons, including observation, interviews, diaries, and photo studies. To conclude the chapter, we discuss the diversity of library users and the importance of each library assessing the information needs and information-related preferences of their particular patrons.

**Chapter 17: The Information-Related Professions: The Underlying Thread of Information Behavior** traces the *thread of information behavior that underlies many (perhaps all?) of the information-related careers* that you might choose to pursue. Information scientists and information professionals work in a wide range of careers, spanning areas such as cybersecurity/information security; data analytics/data science; information technology; librarianship/content development, organization, and preservation; social media; software development; and user experience. In this chapter, we list some sample job titles within each of these areas and then take a more in-depth look at ten specific jobs [(1) Cyber Defense Technologist, (2) Data Scientist, (3) Derivatives Analyst, (4) Technical Writer, (5) Web Designer/Web Developer, (6) Digital Curation Specialist, (7) Young Adult Librarian, (8) Social Media Strategist, (9) Software Design Analyst, and (10) User Experience (UX) Specialist]. For each of these jobs, we look at some of the specific ways in which information behavior intersects with these positions, pervading the roles and responsibilities that are commonly associated with each one. To conclude the chapter, we underscore the *importance of information behavior to careers in the information professions*, particularly emphasizing the value of developing an in-depth and up-to-date understanding of the information needs, information-related preferences, and information behaviors of your users (e.g., patrons, customers, co-workers). Our goal for this final chapter is to draw a clear connection between the content of this book and the various careers that many of you might pursue.

Throughout this book, you'll learn more about the concept of information behavior, as well as about many important interrelated concepts, such as *information access*, *information literacy*, *satisficing*, *information overload*, and *selective exposure*. Information

behavior, when all goes well, is problem free and nearly invisible. However, this is the exception rather than the norm, as people frequently encounter barriers that can keep them from getting relevant, trustworthy, and actionable information that fulfills their information needs and enables them to reach their goals. As budding information professionals, you will have many opportunities (and an important responsibility) throughout your career to minimize the information-related barriers that people will encounter, to help people overcome the barriers that do exist, and to improve information resources, processes, services, and systems to address these barriers, thereby aiding both current and future users. Depending on the setting that you're working in, you may be focused on helping users within your organization (e.g., your co-workers) or your organization's clients/customers/or patrons to reach their information-related goals. To successfully do so, you will need in-depth knowledge of the information behavior – including the information needs, information-related preferences, and information-seeking strategies – of any and all relevant stakeholder groups in order to best support them as they strive to reach their goals.

It is our hope that you find this book to be accessible, relevant, and useful, and that the knowledge you gain will enable you to maximize your helpfulness for all of those individuals who will ultimately encounter and benefit from your work. Information is an incredibly powerful tool, but only when that information is relevant, trustworthy, actionable, and, perhaps most importantly, accessible to the users who need it, when and where they need it. We trust that you will use your knowledge, your skills, and your position to facilitate people's access to useful information, enabling them to harness the power of information to make better informed decisions and to optimize their potential and actual outcomes as well as the impacts that they, in turn, can make on the lives of others. We wish you the best in your studies and in your careers as information professionals!

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# 1

## *Introduction to Information Behavior*

*Lupe Marillo, a freshman who had recently arrived on campus at Pocatello College, needed to know how to protect herself from COVID-19. She turned to Google, searching for “COVID-19 protection.” A public service announcement written by the World Health Organization (WHO) appeared at the top of her search results. Reading through this announcement, Lupe learned that she should try to stay in her apartment as much as possible and that when she did go out, she should wear a mask and keep a safe distance from other people. She also learned that, in addition to frequently washing her hands with soap and water or using hand sanitizer, she should routinely disinfect objects and surfaces that she frequently touches. Lupe purchased a mask and hand sanitizer online and was very careful to observe all of these practices as she began her first year at Pocatello College.*

*Lori Lopez, a 56-year-old waitress, was diagnosed with prediabetes (which can be a precursor to type 2 diabetes) when she had her physical last week. Her doctor gave her very little information, other than telling her this diagnosis and warning her to*

*be careful because it could become type 2 diabetes. Lori asked a nurse friend (Dorie) out for coffee, hoping to be able to ask her about this diagnosis. When it came time for their coffee date, Lori mentioned that she had recently been diagnosed with prediabetes and she felt there might be things she needed to know, but she didn't really know enough to know whether or not she was missing important information or to know what particular questions she should be asking. Luckily, Dorie had been working in a diabetes clinic for decades, so she was able to tell Lori the things that every individual newly diagnosed with prediabetes needs to know, such as the importance of losing weight (if one is overweight), exercising regularly, and eating healthy. Dorie was also able to share with Lori that being diagnosed with prediabetes is really a gift, because having this knowledge provides one with the opportunity to learn about and make lifestyle changes that can keep one from developing type 2 diabetes, potentially enabling them to avoid the serious complications that can accompany this disease.*

*Ronit Rahman, a freshman at Culpeper University, needed to find out how to request a particular dorm room for the next academic year. He went to his university's website and searched for the word "dorm." Because this query retrieved several thousand results and none of the results on the first page looked at all relevant, he scrolled back up to the search bar and typed "request dorm room." The second link brought him to the Resident Life Department's website, where he was able to fill out an online request form. After submitting his form, Ronit received an email letting him know that he should expect to hear back in early May.*

*Emily Elansara, a junior at Hartley Community College, overheard some of her classmates saying that they had heard that a new vaccine that could prevent COVID-19 is now available. When she got home that evening, Emily went to Google and searched "COVID-19 vaccine." Scrolling through the results page, she noticed the following under the "Common Questions" heading: "Is there a vaccine for the coronavirus disease?" Clicking on this question, she*

*read that there is no vaccine at this time. However, because there was no date listed, she figured that this information could be outdated. She then scrolled back up and clicked on “Tools,” selecting the time frame of “Past 24 hours.” Scrolling through the first page of search results, she noticed that none of them explicitly stated that a vaccine is readily available. Realizing that it was now after 11:00 p.m. and remembering that she had a paper due in her ethics class the next day, Emily abandoned her search, figuring she’d check with her Mom (who’s a nurse) when she visits her over the weekend.*

*Prajith Parra, a New York City taxi driver, had been diagnosed with type 2 diabetes more than five years ago. At the time, his doctor had told him that in order to keep his blood sugars from spiking (which can cause serious damage to one’s blood vessels, nerves, and major organs), he would need to eat six small meals each day, and that these meals needed to be low in carbohydrates (specifically, no more than 75 grams at each meal). Due to the nature of his job, Prajith felt that this was simply impractical for him, and so he had promptly thrown away all of the pamphlets his doctor had given him and forgotten about his doctor’s advice (and even the fact that he had been diagnosed with type 2 diabetes).*

*Layla Johnson, a senior at Vermont State College majoring in bioinformatics, is having a very difficult time in her advanced biostatistics class. Last Friday, she took her midterm exam and is now pretty convinced that she bombed the test. The teacher just sent a group email to all of the students in the class to let them know that their grades have been posted online. After gathering her courage, Layla logged into the course website and saw that instead of a grade, the teacher had left her a note: “Please make an appointment to come see me.” Layla has yet to email her teacher to set up a meeting because she would rather remain uncertain about her grade than find out for certain that she had, in fact, bombed the test.*

\* \* \*

Have you noticed a unifying thread running through all of these stories? Each of these vignettes focuses on both information and an individual's behaviors around information – the intersection known as “information behavior.” Information behavior is an umbrella term that encompasses people’s interactions (as well as their non-interactions) with information. Wilson (2000) defined information behavior as “The totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use” (p. 249). Simply put: Information behavior = (information) + (a verb).

The verb in this equation can be anything at all – needing, believing, seeking, organizing, managing, assessing, sharing, or using. In fact, the verb can even be a lack of action (such as not needing information, not seeking it, ignoring it, or not using it) and even actions such as actively avoiding information, rejecting it, or simply discarding it. The concept of information behavior encompasses all of these activities and non-activities. The only requirements for classifying an action (or inaction) as human information behavior are that there is at least one human and at least one piece of information involved.

In this chapter, we will first step through each of the vignettes above, identifying the various aspects of the stories that are related to information behavior, such as information need, information seeking, and information use. Next, we will provide a brief description of the scope, the evolution, and the importance of the concept and the field of information behavior. In the final section of this chapter, we shift our focus to people’s information behavior during the current COVID-19 pandemic, with the goal of further highlighting some of the important aspects and impacts of information behavior within the context of a current global crisis. We also highlight some of the many very important roles that information professionals are playing to help address the current overwhelming glut of information, misinformation, and disinformation about COVID-19, which has been dubbed an “infodemic” by the World Health Organization.

## **ANALYZING THE VIGNETTES**

In the first vignette, we read about Lupe arriving on campus and needing information about how to protect herself from COVID-19. Lupe immediately acts on this need, securing the needed information from Google. She then promptly puts this information into action, buying the items (mask and hand sanitizer) she'll need and adopting the recommended behaviors to protect herself from the virus. This vignette includes an *information need*, *information seeking*, and *information use*. It is important to note that this smooth progression from information need to seeking to use that Lupe experiences is actually relatively rare. People may encounter a number of barriers at any point along their information journeys. For example, people may be unaware that they have a need for information, unable to identify exactly what their need is, unfamiliar with sources that might contain the information they need, unable to gain access to those sources, unable to successfully find the specific information they need, unable to assess whether the information they find is trustworthy, and/or unable to act on the information they find. Look carefully at the other vignettes. Can you identify the different types of barriers that can arise with regard to people's information behaviors?

In the second vignette, we read about Lori feeling like she might need more information after receiving a medical diagnosis but not having a clear understanding of those needs. Lori proceeds to seek more information from her nurse friend, Dorie, and learns more about her own needs for information and the changes she can make in her life in order to reduce the chance that her prediabetes will advance into type 2 diabetes. This vignette includes *information provision/receipt*, perhaps some degree of *incognizance* (that is, having a need for information, but not being aware that one needs information), a *visceral information need* (which involves having a visceral sense that one needs information, but not knowing what those needs are), *information seeking*, and, potentially, *information use* if Lori decides to act on the information she received from Dorie.

In the third vignette, Ronit has a very well-defined need for information and proceeds to his university's website to seek information to fulfill this need. However, his first query is not specific

enough, and he has to reformulate his query in order to reach a Web page that tells him that he needs to fill out an online form and to actually get access to that form. Ronit fills out the form and waits to hear whether he will get the room he requested. This vignette encompasses *information need*, *information seeking* (involving some *query reformulation*), and *information use* (that is, filling out and submitting the request form).

In the fourth story, Emily gathers information passively, simply overhearing her classmates mention that there is now a vaccine for COVID-19. When she gets home, she tries to verify this information online. She encounters some difficulties in doing so and ultimately decides to give up the search for the time being and to check with her mom over the weekend. This vignette includes both *passive and active information seeking*, *query reformulation*, and *giving up on a search for information*, but with the intention that she would ultimately *revisit this information need* and consult her mother.

In the fifth vignette, Prajith was diagnosed with type 2 diabetes by his doctor and was provided with information about managing this disease; however, Prajith considered this information to be impractical, decided to not make any of the lifestyle changes mentioned by his doctor, and discarded the information. This vignette includes *information provision/receipt* and *information non-use*.

In the final vignette, Layla avoids information (her score on her advanced biostatistics exam) because she is worried that she did not do well. In this case, Layla prefers to remain uncertain about her score, rather than to find out whether she did, in fact, bomb the test. This vignette demonstrates *information avoidance* and illustrates the important role that *uncertainty* can play in driving one to seek – or in this case, not to seek – information.

## **SCOPE, EVOLUTION, AND IMPORTANCE OF THE CONCEPT AND FIELD [SEP] OF INFORMATION BEHAVIOR**

As our earlier definition of information behavior as “information + a verb” suggests, the scope of information behavior is very broad.

People engage (or do not engage) in information behaviors regularly throughout the day. Perhaps your phone woke you up this morning by alerting you to a news headline. Maybe you clicked through and read the story or maybe the headline caused you to simply turn your phone off as you've decided to stop following the glut of stories on that particular topic. Both of these are information behaviors! Information behaviors are taking place all around us – in our homes, at our workplaces, at schools, in restaurants, on playgrounds, in hair salons, or at campsites. Everyone – babies, children, teens, adults, and arguably cats and dogs and perhaps other types of animals as well (though this book is about humans – sorry!) – regularly engages in information behaviors, and these behaviors can pertain to any topic at all. It is important that we broadly define “information behavior,” and even the term “information” itself, so that our definition encompasses everyone’s information needs and the resources that they may deem to be “information” at some point in time. As information professionals, one of our very central tasks is to assist people with their information needs; our helpfulness will be limited if we exclude certain types of behaviors from our definition of information behavior and if we exclude certain types of information from our definition of information. For example, if I say that seeking information from a blog is not “true” information behavior and that a blog is not information, I am not just being judgmental – I am actually excluding all of those individuals who use blogs and who find them to be informative and helpful, thereby limiting my ability to be helpful to these individuals.

The field of information behavior is about a century old and has undergone some very important changes throughout this time. Early information behavior research (roughly the first half of the 1900s) largely focused on library use – libraries wanted to know who was making use of their materials. With World War II came a shift in information behavior studies to heavily focus on scientists’ use of information and information systems for their work. These early studies – both library use studies and studies of scientists’ information behaviors – were centered on the information and the information systems (the “stuff”), rather than the users themselves. Beginning around the 1970s, there was an important shift in the field, moving

from a focus on the “stuff” to a focus on the user, their information needs, and their information behaviors. The field also broadened to encompass people’s information behaviors within their everyday life context – that is, their information behaviors that do not pertain to work or school, such as their hobby-related information behaviors. There was also a much-needed shift to begin incorporating more qualitative methods (such as interviewing) in information behavior research studies, rather than relying solely on quantitative methods. Although quantitative methods are certainly important, they limit the types of questions you can investigate to questions such as “how many,” “how much,” or “how often.” The addition of qualitative methods enabled researchers to investigate more user-centered (rather than stuff-centered) questions – deeper “why” and “how” questions pertaining to people, their information needs, and their information behaviors (Case & Given, 2016).

Although early studies focused on “stuff” and who was using it, more modern studies (those roughly over the past half-century) have placed much more emphasis on the individual needing information and the behaviors they engage in (or not) in order to seek, assess, manage, share, and use this information. To illustrate this shift, consider the following example: (a) A child enters a library and asks for a book on aardvarks, so the librarian walks him over to a section of the library that contains ten books on aardvarks; (b) A child enters a library and asks for a book on aardvarks, so the librarian asks him why he is interested in aardvarks, if there’s any particular thing he’d like to know, whether this is for an assignment for class or just something he’s curious about, or something he needs for another purpose. The librarian’s response in (b) is much more user focused than the librarian’s response in (a). In (a), the librarian is just a keeper/locator of the books, while in (b), the librarian is much more committed to helping the child by identifying and fulfilling the child’s actual information need.

Ideally, information behavior research and information professional practice go hand in hand – they both drive and inform one another. What we learn from information professional practice can drive information behavior research, which in turn can provide findings that

can be drawn upon to inform and improve information professional practice. As an information professional, you will be able to optimize your ability to help people (whether directly or indirectly) by learning about their information behavior. You can draw upon information behavior researchers' existing work for this purpose, and you can also conduct your own investigations. When drawing upon the work of other researchers, you must double-check that they have actually collected data from your intended audience, whether via interviews, surveys, observations, or other means. For example, if you want to learn about immigrants' information needs, it is important to draw on a study that involved actual immigrants, rather than a study that asked social workers who have worked with immigrants what information they *think* immigrants need – you want it "straight from the horse's mouth," so to speak. If there is no such work or if there is but it is scant and/or outdated, it can be very beneficial to conduct your own research with members of your target audience (that is, your users, customers, and patrons).

## **INFORMATION BEHAVIOR IN THE ERA OF COVID-19**

The current era of COVID-19 offers us an interesting context in which to investigate people's information behavior. In a field called "crisis informatics," researchers explore people's information behaviors within emergency situations (Lopatovska & Smiley, 2014). Within this field, some type of crisis, whether natural or man made, forms the context of people's information behavior. People's information behaviors are shaped by and unfold across the backdrop of the particular crisis context. And their information behaviors, in turn, often contribute to shaping the context itself. In this section, we'll look at people's information behaviors, including their information needs, information seeking, and information assessment practices within the context of the COVID-19 pandemic. We'll also discuss the many important roles that information professionals are playing in the pandemic, helping to address the infodemic.

People's information needs around COVID-19 are wide ranging. We need to know how widespread the virus is in our communities,

how to protect ourselves and our loved ones, the types of symptoms that could indicate that we have COVID-19, and what to do if we think we might have COVID-19. Though many people are driven to seek information in order to fulfill these needs, some people may engage in information avoidance; that is, they may feel like they would rather not know anything on this topic. In fact, some people may even make a conscious effort to try to ensure that they will not encounter COVID-19-related information.

People's strategies for seeking information on the topic of COVID-19 also vary a great deal. People may watch the news on television, read newspapers or magazines, or ask their doctors. They may also visit various types of sites online, such as news channel sites and trusted medical websites, such as the National Library of Medicine's Medline Plus (<https://medlineplus.gov>), the Centers for Disease Control and Prevention (CDC) (<https://www.cdc.gov>), or the Mayo Clinic (<https://www.mayoclinic.org/patient-care-and-health-information>). A substantial number of people are (also) turning to social media sites, such as Twitter, Facebook, Instagram, and YouTube.

A very important aspect of people's information behavior is information assessment – evaluating the information that one has found in order to discern whether it's relevant, trustworthy, and useful. People's willingness and ability to engage in these evaluative processes vary a great deal and can have life-or-death consequences in times of crisis, such as the current pandemic. Many people are experiencing information overload, feeling completely overwhelmed by the sheer quantity of information available on the topic. And not all of this information is true – over the first six months of the pandemic, we have seen the proliferation of both misinformation (inaccurate information) and disinformation (inaccurate information distributed with the intent to deceive people) about COVID-19 across both online and off-line sources. Unfortunately, thousands of people have become ill or have died as a result of acting on this bad information, trying out harmful substances that have been purported to prevent or treat COVID-19 (Coleman, 2020).

A recent Gallup poll (Jones, 2020) surveyed 1,693 US adults about their information-related perceptions and information behaviors around COVID-19. This study found that 78 percent of the respondents felt that false or inaccurate coronavirus-related information has been a major problem. Just 58 percent of respondents felt well-informed about the coronavirus and more than one-third (36 percent) reported experiencing information overload. When asked to name the two most common sources of misinformation, 68 percent mentioned social media and 54 percent mentioned the Trump administration. Respondents' strategies for deciding what coronavirus-related information is accurate and what is not were found to vary based on age. Young and middle-aged adults were more likely to say that they are going directly to health professionals or official health organization websites and consulting a wider variety of news sources than they normally do in order to see where they agree. Older adults (ages 55+), however, were more likely to say that they are getting their coronavirus-related information from just the one or two news sources they trust the most. When asked how they feel social media companies ought to respond when someone posts inaccurate coronavirus-related information on their sites, respondents were split: 42 percent felt that the company should immediately take down the post; 42 percent felt that the company should leave the post up until they have confirmed the accuracy of the post; and 14 percent said that the company should simply leave the post up and not try to confirm the accuracy of the information. What are your thoughts on this?

Information professionals of all types are playing very important roles in the pandemic, particularly with regard to what the World Health Organization has labeled an “infodemic.” The sheer volume of information – comprising and comingling information that ranges from completely factual to completely untrue – is very difficult for the public to deal with. Information professionals are helping to make accurate coronavirus-related information more accessible to the public by undertaking activities such as collecting trustworthy information (or links to trustworthy sources of information) and making it all available in one place. Some examples of this are the COVID-19-related

LibGuides (i.e., online collections of links to information on a particular topic) prepared by Rutgers University Libraries ([https://libguides.rutgers.edu/covid19\\_resources/home](https://libguides.rutgers.edu/covid19_resources/home)) and the Clinton-Essex-Franklin (New York) Library System (<http://cefls.libguides.com/coronavirus>).

Information professionals are also offering information literacy classes and workshops to teach people how to find and evaluate health information online. Some examples of this are Montgomery County (Maryland) Public Libraries' workshop to help consumers identify COVID-19-related scams ("Scams in the Time of COVID-19: A Virtual Session"; <https://mcpl.libnet.info/event/4274691>) and Denver Public Library's online workshop, "How to Spot Fake News: The COVID-19 Edition"; <https://www.denverlibrary.org/blog/research/robin/how-spot-fake-news-covid19-edition>). Other information professionals are developing COVID-19 tracking and contact tracing apps, such as Citizen's SafeTrace app (<https://apps.apple.com/us/app/citizen-safetrace/id1519364877>). As information professionals work to address the infodemic, those professionals who take the time to develop an in-depth and up-to-date understanding of their users' (or patrons', customers', managers', and colleagues') information needs, information-related preferences, and information behaviors will be best positioned to successfully assist them with their information needs.

## CONCLUDING THOUGHTS

In this chapter, we first introduced the main topic of this book – information behavior – and then discussed the scope, evolution, and importance of the concept and field of information behavior. We also discussed why information behavior is relevant and important to you, as a budding information professional. To close the chapter, we looked at people's information behaviors within the context of the current COVID-19 pandemic and discussed the important roles that information professionals can play in helping to combat the "infodemic."

One final thought before we move to [Chapter 2](#), where we will introduce the fundamental concepts underpinning information behavior: When many people first hear the phrase “information behavior,” they are confused and point out, rightly, that information doesn’t behave. Although this is certainly true, *people* do (or don’t!) behave – the trick for you as an information professional is to learn about the information behavior of your target audience, which may be your customers, your patrons, your co-workers, or some other user group, with an eye toward using this knowledge to help them. What can *you* do to minimize and/or eliminate the many types of barriers that prevent your users from being able to effectively and efficiently access, understand, manage, and/or use the information they need?

## DISCUSSION QUESTIONS

- Select one of the vignettes from the beginning of this chapter. How would you go about helping this individual with their information need? Is there some information resource, program, service, or app that you might design to assist people with a similar information need? If so, how would you go about designing this resource/program/service/app? What kinds of factors would you take into consideration during your design process? How might your resource/program/service/app help to facilitate their information-seeking processes and ensure that their information need is fulfilled as effectively and efficiently as possible?
- What are some examples of information behaviors that are not explicitly mentioned in this chapter (e.g., affording, celebrating, creating, stealing)? Remember:  
information behavior = (information) + (a verb)
- Have you come across any misinformation or disinformation about COVID-19? What was the source of this information? How did you know that you couldn’t trust the information?
- What type of career are you planning to pursue after you graduate from your program? How might information behavior be

relevant to the career you're considering and the roles and responsibilities you're likely to have? How will your knowledge of information behavior help to enhance your ability to assist people with their information needs and/or to prevent and eliminate barriers that can keep them from being able to access, understand, or use the information they need?

**Learning Activity:** Think about the last time you went on a prolonged (and memorable) search for information. What was your information need (e.g., I needed to know about the history of board games in the United States)? What was the context of this need (e.g., I was writing a paper for my history seminar)? How did you go about seeking information? What source(s) did you consult? Why? Which sources proved most helpful? Which proved least helpful? Were you able to obtain the information you needed? What outcomes resulted from your information search? If you were to have a similar information need in the future, would you conduct a similar search? Is there anything you would change about your process? If so, what would you change and why?

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# 2

## *Fundamental Concepts*

*As Maria began her junior year in high school, she realized that she needed to begin looking into the various colleges that she might like to attend. Maria talked to her parents about this, but as neither of them had attended college themselves they felt somewhat limited as to the advice they could give her. Maria decided to speak with the guidance counselor at her school, who gave her some general tips and then told her that she should use the Internet to research potential schools. Using more formal sources such as Peterson's (<https://www.petersons.com>) and the US Department of Education's College Scorecard (<https://collegescorecard.ed.gov>), as well as less formal sources such as forums and blogs, Maria was eventually able to narrow her choices to her top five schools.*

\* \* \*

This story illustrates both the everyday nature and the potential importance of information behavior. Information behavior is an umbrella term that covers any type of activity that involves information, such as needing information, seeking information, evaluating the credibility of information, managing information, and using information. However, this umbrella is very wide – it also encompasses the opposite or the lack of such activities, such as being unaware of an information need; choosing not to find information to fill a need; actively avoiding information that might relate to this need; automatically believing the information one finds without making an effort to assess its actual credibility; and having relevant, trustworthy information in hand, but not actually using it.

In this chapter, we will explore the fundamental building blocks of information behavior. We will first consider the central concept of information and then discuss the three concepts that are most frequently used to define information behavior – information needs, information seeking, and information use. We will then move to two special types of information behaviors – incognizance (unawareness of an information need) and information avoidance. In the final section of this chapter, we will discuss the importance of information behavior and the central (though frequently underlying and, thus, more difficult to see) role it plays throughout the discipline of information science and all related professions. The chapter will end with a cautionary case study about the potential perils of information professionals (here, UX designers) ignoring people's information-related preferences and their information behaviors.

## **INFORMATION BEHAVIOR / INFORMATION NEEDS, SEEKING, AND USE (INSU)**

Information is at the very heart of information behavior, so we will first briefly discuss the meanings and scope of this term. Historically, information behavior has also been referred to as “Information Needs, Seeking, and Use,” or “INSU,” as these three were held to be the most central components of information behavior. Following our discussion of the term “information,” each of these three concepts will be explored in the following subsections.

### **Information**

For the purposes of this book, information will be treated as anything that somebody might perceive to be informative at some time. We adopt Case and Given’s (2016) definition of information as “any difference that makes a difference to a conscious, human mind” (p. 56). We also adapt their interpretation that information is still information, whether:

- It is perceived to be useful or not;
- It reduces or increases a person’s uncertainty;
- It is objective or subjective;
- It pertains to the process of informing, the actual knowledge itself, or a physical thing, such as a document;
- It is from a formal source (such as your doctor) or an informal source (such as your best friend);
- It is internally or externally generated;
- It is intended for communication or not (an example of the latter being your sister’s writings in her private diary);
- It is true or not, as in the case of both misinformation (information that is incorrect, regardless of the communicator’s intention) and disinformation

- (incorrect information that is meant to purposefully deceive someone);
- It is tangible or intangible (an example of the latter being information embedded in an object that gives us clues as to how we might use it, which Norman (2013) calls an “affordance”; a common example is a coffeepot – the shape of the handle signals how you might grab it with your hand and use it to pour out the liquid in the pot);
  - It has structure and process or completely lacks both of these (an example of the latter is when the very lack of news on a topic provides you with information).

In sum, we agree with Buckland's (1991) contention: “Being ‘informative’ is situational and it would be rash to state of *any* thing that it might not be informative, hence information, in some conceivable situation” (p. 359). We also concur with Bates (2005), who asked, “How can we realistically study information-seeking behavior if we cannot consider as at least potentially informative all those things a person has *not yet* been informed by?” We call for the broadest interpretation of what is meant by the term “information.” We also hold the encompassing view that information behavior focuses not only on people’s interactions with information, but also on their lack of interactions with information.

**Table 2.1. What Is (Not) Information?**



**For Discussion:**  
Are tree rings information?  
Perhaps they are not information to you or me; however, dendochronologists are able to read these rings in order to tell how old a tree is and to identify and date climate conditions and environmental events that took place at various times during the life of the tree.

(<https://flic.kr/p/HMGM59>)

## Information Needs

An information need is frequently what drives a person to seek information – realizing that you have a gap in your knowledge (Dervin & Foreman-Wernet, 2003) or an “anomalous state of knowledge” (ASK) (Belkin, 1980; Belkin, Oddy, & Brooks, 1982) that is preventing you from doing something that you want to do may prompt you to look for information. However, information needs do not always result in information seeking. Additionally, factors other than information needs sometimes motivate someone to look for information. Have you ever had an information need that you did not act on? Perhaps you needed to know the weather forecast this morning but didn’t have time to check it before you had to leave your house. Or perhaps after your doctor diagnosed you with something that sounded scary, you didn’t want to find out any more about it. Conversely, sometimes people engage in information seeking even though they do not have a specific information need. For example, you may decide to surf the Internet for cat photos just because you enjoy looking at them. Or you may look up information about sharks just because you’re curious about them. In sum, recognizing an information need may or may *not* lead to information seeking and information seeking may or may *not* be driven by an information need. Additionally, sometimes seeking information for one particular topic may lead you to information that helps you to recognize (and maybe even fulfill) a previously unrecognized information need on an entirely different topic. This chance encounter with useful information has been termed “serendipity” or “information encountering” (Erdelez, 1999).

Information needs vary along a continuum of consciousness. Sometimes a person is completely unaware that they even have a need for information. For example, when someone first learns they have type 2 diabetes or another chronic disease, they frequently don’t know what questions they should be asking their doctor. In an ideal situation, the doctor is aware of the patient’s likely information needs, even if the patient is not, and preemptively provides the information the patient will be needing now and in the near future. This lack of awareness that one even has an information need has been termed “incognizance” and will be explored more fully later in this chapter. On the other end of the spectrum, a person may be fully aware that they have an information need and be able to clearly articulate this need to another person who might be able to assist them.

Information needs may be completely objective, completely subjective, or somewhere in between. Whether or not the Red Sox won last night is an example of an objective information need. Far more frequently, we are faced with much more subjective information needs; such information needs are not quite so clearly defined, are more ongoing, and are more likely to be emotionally driven (such as by a sense of uncertainty and/or anxiety). Such needs cannot be answered with one simple fact. Learning how to cope following a diagnosis of a serious illness, such as cancer, is an example of a subjective information need. No one fact is likely to satisfy this need. This type of need is likely to be ongoing in nature, leading to a longer, nonlinear, iterative process of information need definition, redefinition,

and refinement; information seeking; and information use. At times, this process may also include information avoidance and/or information non-use.

Information needs rarely remain static – they frequently evolve across time. The information you believe you need on a particular topic at this moment is likely to be quite different from the information you believe you need after spending a couple of hours on the Internet or consulting a qualified professional (for example, your lawyer) on the topic. Robert S. Taylor (1968), an academic librarian and a university professor, interviewed librarians and information professionals working at a university library reference desk about their interactions with patrons who sought their help with an information need. Based on these interviews, Taylor identified “four levels of information need” or stages through which patrons appeared to move in regard to their information need. At the first level, people had a “visceral need,” which was merely a vague sense that they were missing some information they needed. When they reached the second level, “conscious need,” they were able to express their information need, but their description was ambiguous and rambling. At the third level, the “formalized need,” their description of their need was much clearer and the librarian thus was better able to help them. The final level, “compromised need,” was actually a step backward. At this level, the patron tried to describe their information need in a way that they felt the librarian would be better able to help them. For example, a patron may need to find out how to feed their new horse, but they try to simplify their need for the librarian by simply asking for a book about horses. Taylor pointed out that the reference librarian’s job is to engage in “question negotiation,” working with the patron to identify their true information need. This frequently involves moving backward from the compromised need (level 4) to one or more of the earlier levels.

Unlike information seeking and use, which are frequently observable, information needs rarely are. Although they can sometimes be inferred through observation, it is far better to ask people what their information needs actually are rather than to assume you already know based just on your observations of their behaviors, facial expressions, and the like. Asking people will also enable you to learn about the context surrounding their information need. Context is a very important aspect of people’s information behavior. Finding out about a person’s context involves asking questions, such as:

- What is the situation in which the information need came up?
- Why does this person need information?
- How much does the person already know on this topic?
- What is the individual aiming to do with this information?

The very important concept of context, which is an inextricable influencing factor in information behavior, will be further explored in [Chapter 4](#).

## Information Seeking

Information seeking is the most frequently discussed member of the information behavior triad – information needs, seeking, and use. Researchers more frequently study information seeking than information needs because information-seeking processes are much easier to observe; however, information seeking and information needs are very closely intertwined. Information seeking may be defined simply as what one does when one has an information need (Case & Given, 2016); however, as described earlier, having an information need does not guarantee that someone will actually seek out information to fulfill that need. In addition, people may seek out information even though they have no specific need. Perhaps it's more accurate to define information seeking as the activities that one may (or may not) undertake to find or encounter information.

Many factors may motivate someone to engage in information seeking. One common motivation for information seeking is the desire to reduce one's uncertainty and anxiety around a topic. However, information seeking frequently increases one's uncertainty and anxiety. For example, your doctor may diagnose you with something that you have never heard of; upon looking up your diagnosis online, you come across a number of additional terms that are unfamiliar to you. People may look for information in order to fill a gap in their knowledge, make a decision, solve a problem, or just because they're curious about a topic. Although recognized information needs frequently drive information seeking, there are times when they do not do so, and a wide range of other factors can motivate information seeking.

As with information needs, information seeking also varies along a continuum. Wilson (1997) identified four types of information-seeking behaviors, including passive attention, passive search, active search, and ongoing search.

- **Passive attention** entails passively absorbing information without purposefully setting out to fulfill an information need. An example of passive attention is when you happen to learn something new simply by watching a show on TV.
- **Passive search** is slightly more active in that it involves happening upon relevant information during an active search for information. An example of passive search might be that while you are shopping for shoes online, you notice an ad for a brand of socks that you had been trying to find earlier.
- **Active search** entails actively looking for information to fill a particular need. An example of an active search is when you go to the library to research the topic you've chosen for your thesis.
- **Ongoing searches** frequently springboard off of active searches, in that the individual purposefully conducts activities that will enable them to keep up with and expand their knowledge on a particular topic. An example of an ongoing search is when you set up a Google Alert (<https://www.google.com/alerts>) for

a topic that interests you so that you will be notified when Google crawls any new websites that contain your specified keyword(s).

There are many types of challenges, however, that may prevent or impede people in their information seeking. Some examples include:

- Being unaware of having an information need;
- Being unable to specify and articulate an information need;
- Not knowing which information sources might prove helpful for a given need and how to gain access to them;
- Not having access to information sources (such as not having a computer and Internet access);
- Lacking necessary literacy skills, making it difficult for one to form searches in the first place and to then understand and evaluate the credibility of the information one does find;
- Feeling highly emotional and/or experiencing negative emotions, such as fear, anxiety, dread, shame, anger, and depression;
- Feeling shame and/or perceiving stigma around an information need;
- Feeling like one lacks social support;
- Having one or more physical and/or cognitive disabilities that can hinder an attempt to access and/or process information;
- Experiencing information overload (i.e., being so overwhelmed by the amount of information available that one experiences great difficulty finding the particular piece of information they need and may, as a consequence, simply give up).

## Information Use

Interestingly, although information use is of crucial importance (after all, what good is information if someone doesn't use it for something?), it is the least frequently studied component of the information needs, information seeking, information use triad (Wilson, 1997). The term "information use" is very ambiguous and can be used to refer to a wide array of activities, including:

- Simply learning something new and thereby adding to one's knowledge;
- Using information to make some decision, solve a problem, and/or reach some desired goal;
- Applying information in some more active way, such as by changing one's behavior in light of what one has learned.

As with information seeking, a number of factors may result in someone not making use of information. For example, people may not act on information because:

- They perceive it to be irrelevant and/or unactionable for them, at least at present given their current situation;
- They don't like the information and the implications it may have for their current choices and future prospects;
- They are not motivated to do so;
- They currently have other factors in their lives that they deem to be higher priority;
- They do not believe that failure to use the information will lead to serious consequences.

## **TWO SPECIAL TYPES OF INFORMATION BEHAVIOR: INCOGNIZANCE AND INFORMATION AVOIDANCE**

Information behavior is frequently presumed to proceed definitively, linearly, and unproblematically from information need to information seeking to information use. However, in reality, information behavior rarely unfolds in such a smooth and guaranteed manner. For example, people often move from information need to information seeking, but then elect not to use the information they have found. They also frequently find themselves iterating multiple times across some or all of these steps as they refine their information need, honing their search techniques and changing up the information sources they're consulting. This iterative process may continue until they ultimately are able to find information that enables them to achieve their information-seeking goal, whether that is reducing uncertainty, satisfying their curiosity, or something else (Bates, 1989).

An information need may be “unrecognized or unacknowledged, undesired, or simply misunderstood, by the individual who has it” (Case & Given, 2016, 81). So a person may have an information need, but be unaware of it, refuse to acknowledge it, reject it, and/or misunderstand it. That is, they may have no knowledge that they even have an information need (“incognizance”). They also may seek to avoid acknowledging an information need, may outright reject it, and may purposefully strive to avoid any information that might relate to it (“information avoidance”). Additionally, people frequently possess information but do not act on it (information non-use). The concepts of incognizance and information avoidance are further explored in the following subsections.

### **Incognizance**

Have you ever needed information but not known that you needed it until after you had to make some decision or take some action? Perhaps you've accepted a job offer only to learn later that three of your close friends left that company during the past year because they felt they were treated poorly by the owner? Frequently, we have information needs of which we're unaware. **We always don't know what we**

**don't know, but we don't always know thatwe don't know.** The term "incognizance" has been used to describe this state in which we have a particular information need but are not aware that we have it (St. Jean, 2017). This state is similar to Belkin's concept of Anomalous State of Knowledge (ASK) (Belkin, 1980; Belkin, Oddy, & Brooks, 1982) and Taylor's (1968) concept of visceral information need; however, incognizance occurs before either of these. A person who is incognizant does not (yet) have a visceral sense that they're missing important information. They are missing important information, but they are completely unaware of this fact. A person who is incognizant with regard to a particular information need will not engage in information seeking. They also will be unable to recognize the relevance and potential usefulness of any information that they may happen to come across that could help to fulfill that information need.

Incognizance is an important factor in information behavior as it is a remediable situation that can lead to negative consequences if not addressed in a timely manner. If we restrict our definition of information behavior to include only those situations in which a person has an information need of which they are at least aware (though perhaps not yet able to effectively pinpoint or articulate), we would exclude the many situations in which we have an information need but are not yet aware of it. One common context in which incognizance occurs relates to our health. For example, we may experience a constellation of symptoms that, when taken together, indicate we have a particular health condition. However, without having been exposed to this information, we may not recognize the importance of these symptoms or understand that they are indicative of a health problem. Similarly, when we first receive a diagnosis from our doctor, we are unlikely to be able to pose the questions that really need to be asked. In an ideal situation, our doctor will provide the information we will need to improve or manage our health condition, without our having to ask, and we will be able to trust and act on that information to optimize our health outcomes.

Ignatieff (1984), a historian and philosopher, stated, "There are few presumptions in human relations more dangerous than the idea that one knows what another human being needs better than they do themselves" (p. 11). However, due to an intellectual understanding of our situation and/or prior experience being in a similar situation, sometimes people other than ourselves are able to identify and preemptively help to fulfill our information needs. For example, someone newly diagnosed with type 2 diabetes is likely to find it quite useful to talk with and/or read about the experiences of someone who had been diagnosed several months earlier. Someone who has had personal experience living and learning through the first few months following a type 2 diabetes diagnosis likely has some useful information to share. They can help the newly diagnosed individual to become aware of their information needs and of the specific questions they should be posing to their doctors. The newly diagnosed patient can learn from observing, listening to, and reading about others who have gone before them,

adopting their strategies that have proven successful and avoiding those that have led to poor outcomes.

### Information Avoidance

Another important and quite common type of information behavior is information avoidance. People may prefer *not* to know something. They may sometimes passively or actively avoid information on a particular topic. An example from the more passive end of the spectrum is a student who does not log into their course website because they're worried they're not doing well, and they don't want to see the grades they've received. An example from the more active end of the spectrum would be a patient who receives a serious diagnosis, such as cancer, and then purposefully arranges their entire day so they're unlikely to come across any information that relates to cancer. Avoiding information on a topic can have some important benefits. For some people in some situations, maintaining or even increasing their uncertainty about a particular topic enables them to control their feelings of anxiety because they are able to maintain hope that their situation is better than it actually may be in reality (Case, Andrews, Johnson, & Allard, 2005).

Although information avoidance can enable a person to maintain hope and feel less uncertain and anxious, it can also have some serious negative consequences. For example, a patient who is engaging in information avoidance is likely to receive less information from their doctors and to be less able to participate in making decisions related to their treatment. They may also be treated paternalistically by their doctors and, ultimately, feel less satisfied with their health-related decisions. Information avoidance can also contribute to poor health outcomes. Avoidance of information pertaining to one's health likely results from, and contributes to, a low level of health literacy, which is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health-care decisions" (Ratzan & Parker, 2000). Limited health literacy levels are very common among US adults, particularly among those who are already disadvantaged, including older, minority, immigrant, and low-income populations (National Network of Libraries of Medicine [NN/LM, n.d.]). People with lower health literacy levels are less likely to get preventative health care and are more likely to be hospitalized and to have poor health outcomes. The importance of health literacy cannot be overstated: A person's health has been found to be more strongly related to their health literacy level than to their age, race, educational attainment, employment status, and income (Weiss, 2007).

Despite the potential for serious negative consequences, information avoidance is not at all uncommon, particularly when it comes to one's health. Many researchers have found that a considerable number of their study participants engage in information avoidance. For example, half of Hack et al.'s (1994) participants (women with breast cancer) said they would prefer to be told the best possible diagnosis, rather than the most likely outcome. Similarly, about a quarter

of Wong et al.'s (2000) participants (men with prostate cancer) preferred to be told the best possible outcome, rather than the most likely outcome or the worst possible outcome. In a study not limited to people who have cancer, St. Jean, Jindal, and Liao (2017) drew on a large, nationally representative survey of US adults, finding that nearly one-third of the survey respondents either strongly (10 percent) or somewhat (21 percent) agreed with the statement "I'd rather not know my chance of getting cancer." Their study showed that, as with limited health literacy levels, information avoidance (defined as agreement with this statement) was linked with a host of other factors suggesting disadvantage, including older age, less education, lower household income, and lack of health-care coverage. Information avoidance was also linked with a reduced likelihood of engaging in health-related information seeking and an increased likelihood of encountering barriers when trying to find and understand cancer information. In addition, information avoidance was linked with lower health-related self-efficacy (less confidence in one's ability to take good care of their health) and with lower information-related self-efficacy (less confidence in one's ability to obtain information about cancer if they needed it).

## BUT WHY SHOULD I STUDY INFORMATION BEHAVIOR?

*Why does information behavior matter?* Let's return to the story about Maria. You have been asked by your employer (a nonprofit agency that helps first-generation college students choose the school they would like to attend) to build an accurate, comprehensive, and neutral website that will enable Maria (and others in the same situation) to effectively and efficiently research different colleges and reach a good decision. If you have never met Maria or anyone else in this situation, how can you build a website that will fit their needs? If you were able to meet with ten people who you would like to be able to benefit from this system, what would you ask them? You would definitely want to gather in-depth information about their information needs. You would also want to know how they generally seek out information – you would not want to build a website that confuses them and ultimately leads to their leaving empty-handed. You would also want to know how you could present the information in a way that will be the most useful for them and enable them to seamlessly incorporate your information into their decision-making process. In short, to build the most helpful website, you will need to first find out about your target population's information behavior and then use this knowledge to guide both your content- and design-related decisions at every step of the way.

## DISCUSSION QUESTIONS

- Can you think of something that is definitely not information? Why would it not count as information?

- Why is it potentially problematic to assume that you understand someone's information needs simply by observing their behaviors?
- Have you ever experienced incognizance? If so, what was the situation? How did you eventually overcome your incognizance?
- Have you ever avoided information on some particular topic? If so, what was the topic and why were you trying to avoid information on this topic? Did you eventually stop trying to avoid information on this topic? If so, do you know why you changed your behavior?
- Why do you think St. Jean et al. (2017) found that people with lower information- and health-related self-efficacy were more likely to agree with the statement "I'd rather not know my chance of getting cancer"?

**Learning Activity:** Please read the following case study and then answer the questions that follow.

## CASE STUDY: IGNORE INFORMATION BEHAVIOR AT YOUR OWN PERIL

Shameer landed his dream job last fall, becoming a UX (user experience) designer for *Retirement Living Today*. *Retirement Living Today* charges members \$30 per year to access their database of living facilities and activities for seniors. The database contains official information about each facility and the organizations that run each of the various activities. Members can add their comments regarding their experiences with each facility/organization and read other members' comments, as well. Over the past decade, *Retirement Living Today* had built up a loyal membership of nearly half a million people. Members range in age from 62 to 95; the average age of their users is 76. Shameer immediately began to redesign the user interface features of the database. He noticed that it was far too simplistic, and he thought of many features that were missing that he would like to have if he were a user. Shortly after implementing the new design, the phones at *Retirement Living Today* began to ring off the hook. Many members were calling to say that the new design was unusable for them and that there were now so many features that they could no longer find the ones they had found to be the most helpful for them in the past. Some callers angrily canceled their membership and demanded a refund.

1. How could Shameer have handled this better?
2. What did he fail to consider?
3. What steps should he have taken before beginning to redesign the user interface for the database?
4. What steps might he take now to try to fix this situation?

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# 3

## *Historical Development of the Field*

### **WHY HISTORY MATTERS**

As you looked through the Contents for this book, you may have seen that this chapter will focus on history and thought to yourself, “Do I *really* need to learn about research from years ago? I want to be a [insert dream job], not sit around reading about studies from the days of yore.” We completely understand this (although we do actually like to sit around and read research studies from long ago!). However, our goal in presenting the information in this chapter is quite simple: We want you to develop a better sense of the roots and foundation of current research in the field of information science on usability, accessibility, user experience, and other areas that will directly impact the work that you do. It is only by understanding the broader universe in which this current research exists that you can fully appreciate how far we have come, in a relatively short period of time, in terms of developing a comprehensive body of research focused on information needs, seeking, and use.

Regardless of the career in information science you ultimately pursue, you are very likely to work with people in one way or another.

And, in one way or another, you are very likely going to need to identify their information and related needs as you work on their behalf. The substantial – and still growing – body of information behavior (often abbreviated as “IB”) research will help you in numerous ways because the answers to many of the questions you may have (e.g., when is the best time to do focus group testing?) have already been examined (and often more than once!) by information behavior researchers. The work of these researchers can be a valuable resource for you, and so the goal of this chapter is to provide you with an introduction to this work so that you can use it as you’re helping others use, manage, and share information. In this chapter, we will first briefly describe how information behavior research has evolved from its early stages until now. We will then highlight key patterns and trends that emerged at various times through this evolution and helped to shape the field. Examples of research studies that exemplify each of these key patterns and trends will be provided. In addition, we will draw your attention to several ongoing issues in the field of information behavior research that impact information science professionals in the “real world.”

## THE EARLY YEARS

Although there are disputes about when the “birth” of information behavior research actually occurred, research on information channels and systems in the early twentieth century seems to be a reasonable place to begin our discussion. At that point in time, we generally thought of information as having a physical form, and so it is probably not surprising that the roots of information behavior research can be traced to studies that focused on library use and reading behavior (Wilson, 2000). Around this time, we also saw the development of a body of research related to mass media that examined questions like “How do people choose which channels to use when undertaking a search for information?” (Case & Given, 2016). During these early years, the research tended to primarily revolve around the tools used to locate information, as well as

sources of information, or in the words of Case and Given (2016), “artifacts and venues” (p. 7).

Public libraries and academic libraries were often the setting for these studies. For example, Louttit and Patrick (1932) sought to test the hypothesis that students would become better acquainted with library resources and facilities throughout their four years at college. They administered a “Library Information Quiz” to approximately 400 students. The study included male and female students who were in their freshmen, sophomore, junior, and senior years. Ultimately, the study did not support the researchers’ hypothesis – i.e., upper-level students were *not* better acquainted with library resources and facilities than those who were in the early stages of their college career.

This research focus on what was going on within libraries continued through the midpoint of the twentieth century. As Bates (2010) observed, “[i]n the 1940’s and 1950’s information seeking and gathering tended to be viewed implicitly as the study of the use of various forms of literature – books, journals, handbooks, etc. – and of various types of institutions and their services. How many books were circulated, how many reference questions were asked, how many people of what economic strata used the public library, and so on” (p. 2386).

## The Movement Toward User-Centered Studies

A new trend began to emerge during the 1950s, as a growing number of studies began to focus on the information behavior of specific groups of professionals, namely scientists, engineers, and others working in “traditional” science disciplines (also known as the hard sciences). Initially, this research too focused on channels and sources, with an emphasis on the use of physical documents (Wilson, 2000). By way of example, Maizell (1960) examined the use of professional and technical literature by research chemists. This study offered a window into the information behavior of chemists, documenting differences in terms of how much technical literature they read on the job, their level of comfort with literature that is more

difficult to comprehend, and their use of older materials. These findings, according to Maizell, would be “helpful in planning library and information services, in refining future inquiries into the ways in which scientists use recorded information, and in improving tests for the identification of creative ability among chemists.”

In time, the body of research focused on the information behavior of professionals grew to include the ways in which these individuals let others know about the work they were doing. We often refer to this as scholarly communication. With this development, researchers began to broaden their focus from channels and sources to the professionals themselves. “During the 1960’s, in particular, generous funding was available in the United States for social science research, and a great deal of knowledge, based on large, well-designed studies, was developed regarding the social aspects of scientific communication and information use” (Bates, 2010).

Lionberger and Hassinger (1954), for example, authored a report that explored the ways in which research conducted within academia, as well as in government and in private industry, can be used to benefit the farming community. “Research has enabled us to make farm work easier, reduce man hours spent in farming, and increase food production. The result has been better farm living and more and better food and fiber at less cost for everyone.” The report stressed that the communication between the researchers and farming community was vital because, without it, the research was of little practical value.

This focus on how professionals use and communicate information soon began to expand beyond scientists and engineers, ultimately encompassing studies that explored the information behavior of a wide range of professionals, including health-care providers (e.g., physicians, nurses, psychologists), lawyers, farmers, and artists, among others (Case & Given, 2016). At the same time, the body of information behavior research began to expand in a different way, looking beyond systems and formal sources to the role of *informal* sources in information seeking and use. As Bates (2010) observed, “In the 1960’s and beyond, studies of information seeking and use by

the general public opened out the research to incorporate many sources of information, of which the library was only one . . . The first surprise was to discover how much information – in both personal and professional contexts – people got from friends and colleagues.”

These changes culminated in perhaps the most fundamental development of information behavior research, namely, the gradual shift to focusing on users themselves – in professional *and* personal contexts – that occurred during the 1970s. With this shift, research began to focus on “where [users] went for information, how the information made them feel, or what kind of results they experienced” (Case, 2016, 8).

Other related, notable developments during this important period of growth in information behavior research included (1) a growing body of literature related to information seeking (as defined in [Chapter 2](#), and (2) broadening of focus beyond the traditional emphasis on the information behavior of specific groups of professionals within their work environment. There was a growing realization that “nonwork” information behavior could and should also be the subject of study. At the same time, the “[f]ocus in the larger society during the 1960’s and 1970’s on identity politics of race, gender, sexual orientation, and the economically under-privileged also led to research attention being directed to information seeking of the corresponding population groups” (Bates, 2010). The use of demographic-based research – examinations of individuals based on age, income, education level, and other characteristics – became popular and remains so even today (Case & Given, 2016).

Wade (1970) offers one such example of this type of research. Her study, conducted at Stanford University, utilized survey methodology to assess the public’s knowledge of topics related to science, health, and public affairs. With respect to health, the study focused on people’s knowledge of health and illness and the extent to which their knowledge changed over time. The analysis of the data revealed that (1) knowledge of specific issues (e.g., Medicare, vaccinations) fluctuated over time and (2) there are correlations between certain

demographic characteristics and health knowledge (e.g., health knowledge rises with increasing educational attainment level).

## A More Holistic Approach to Information Behavior Studies

And so, within a span of little more than a half-century, the field of information behavior research has transformed from one narrowly focused on the systems and sources used by select groups of professionals to one that is interested in exploring how nearly every conceivable group of users looks for, uses, and shares information in an ever increasing number of contexts. This broadening of focus has been accompanied by growing attention paid to understanding users' information behavior less in terms of search queries and more in terms of the problems and real-world situations that have given rise to the information need (Spink & Cole, 2006). A 1986 article written by Brenda Dervin and Michael Nilan – titled “Information Needs and Uses” – is often described as a pivotal moment in the history of information behavior research, at which time researchers began to think about users in a more holistic sense (Talja & Hartel, 2007).

According to Dervin and Nilan (1986, 10), traditional use and user studies primarily focused on individuals' use of information sources and their sociodemographic characteristics. Traditional studies mainly addressed questions such as “how often is system X used and by whom?” focusing on observable dimensions of behaviour (ibid., 10). Dervin and Nilan argued that traditional use and user studies constructed users mainly as passive and essentially homogeneous recipients of information (ibid., 13). (Talja & Hartel, 2007, 3–4)<sup>1</sup>

A study conducted by Perkins and Rao (1990) offers a good example of this newer approach to information use studies. With the goal of increasing understanding of how marketing managers make decisions, this study focused on the extent to which managerial experience impacts marketing managers' information use and decision-making. The researchers concluded that experience manifests not only in the decision itself, but also in the way in which managers evaluate and use “soft” information and the amount of information they use. In other words, experience plays an important role in how they go about making decisions. The researchers

concluded that findings from this study could be used to develop training materials as well as marketing models, thereby improving managerial decision-making by professionals in the field.

Thirty years after the publication of Dervin and Nilan's (1986) seminal work, this focus on the specific contexts and situations in which information behavior occurs has become a hallmark of the field. "In the 1990's and 2000's ... researchers expanded their look at information behavior by incorporating the whole environment – physical, social, and technological – in the study of people's interactions with information. Social context and social situation were recognized as essential to the understanding of information seeking." (Bates, 2010).

A frequently cited study conducted by Fisher, Durrance, and Hinton (2004) exemplifies this particular trend. At the time of this study, the information behavior of immigrants had not been extensively studied, due to barriers created by language, culture, and other factors. To learn more about immigrants' participation in coping skills and literacy programs at the Queens Borough Public Library (QBPL), the researchers conducted interviews and observations of various stakeholders, including program participants and volunteers as well as library administrators and staff members. Through this data, they were able to identify a set of outcomes experienced by QBPL patrons, broken down into two broad categories – building block outcomes (e.g., experiencing the library as a safe and welcoming place, spreading the word about the library to their family and friends) and personal gains (e.g., gaining technical skills, developing self-confidence, and becoming better prepared for employment).

## **Where Are We Now?**

In 2014, Julien and O'Brien published a study that examined trends in information behavior research over the past 30 years, the latest in a series of studies dating back to 1996. This study involved a quantitative content analysis of 721 articles retrieved from a database that housed a substantial collection of work published in the field of

library and information science (LIS). Among the key trends noted by Julien and O'Brien were:

- LIS scholars are authoring proportionally more information behavior literature than practitioners;
- Studies of nonprofessional workers are becoming more popular;
- More studies are considering users' cognition.

These findings are not only of interest to others who conduct information behavior research but also to a broader audience, including information science professionals who can use this research to better serve their clients, customers, or other users. As more research focuses on the "general public" as opposed to specific groups of professionals, for example, those involved in the development and design of information systems in the retail and finance sectors can learn more about the information needs and preferences of average, ordinary individuals in their day-to-day lives.

## **PATTERNS AND TRENDS IN INFORMATION BEHAVIOR RESEARCH**

As we reflect on this timeline of information behavior research, let's focus our attention a bit more on several patterns and trends that have emerged since those early studies of library users and the books that they read.

### **Increasing Use of Qualitative Research Methods**

Research methods are often generally categorized as either quantitative (aiming to answer numeric questions, such as "how many?" or "how much?") or qualitative (aiming to answer more complex, in-depth questions, such as "how?" or "why?"), as we will discuss in much greater detail in [Chapter 8](#). The shift from a system-centered approach to a more holistic user-centered approach in information behavior research ushered in changes in terms of the research methods employed. Vakkari (1997) even went as far as to

assert that “a qualitative grounded-theory influenced research approach focusing on contextual aspects of the user’s situation had, almost entirely, replaced quantitative studies and earlier metatheories” (Talja & Hartel, 2007). David Ellis, Brenda Dervin, Carol Kuhlthau, and T. D. Wilson – to whom you’ll be introduced in [Chapter 12](#) – all use qualitative approaches in their examinations of information behavior (Gaston, 2017; Wilson, 2000).

In their 2014 study, Julien and O’Brien found that interviews – a traditional qualitative research method – were used to collect data in a little less than 50 percent of the sample of LIS literature they studied. In comparison, experiments were used in only 4 percent of the studies. This reliance on qualitative methods makes sense as developing a better understanding of context (a concept we’ll explore in [Chapter 4](#) requires us to ask questions about how and why users interact with information. Quantitative data, in general, cannot provide us with answers to these questions.

## **Emphasis on Empirical Research**

Since the early days of information behavior research, there has been a marked preference for empirical research (i.e., studies based on observation or experimentation) over theoretical research (Vakkari, 2008). Julien and O’Brien (2014) found that 76 percent of the studies included in their analysis were atheoretical; that is, they did not draw on any existing theories in the design and implementation of their studies. They noted that earlier studies had painted a somewhat different picture by focusing on the fact that information behavior research tended to be more theoretical than other areas of LIS research (citing, for example, Pettigrew and McKechnie [2000]). Nevertheless, Julien and O’Brien labeled this finding as “disappointing” (p. 241), expressing concern that the widespread lack of theoretical foundation underlying much of information behavior research was among the reasons that this research struggled to gain traction outside the field of information science.

Why does this matter? Vakkari (2008) suggested that atheoretical research was more likely to be descriptive and less likely to

contribute to the construction of models that would help us better understand how various concepts relate to one another. One of the reasons why we will devote a fair amount of time in this book to breaking down and explaining the models that have been developed in the field of information behavior research is precisely because of how much they can help us understand the processes of information seeking and use. And, with this understanding, we can begin to think more clearly about how we can create information products, services, and resources that take these processes into account.

## **Growing Interest in “Everyday” Information**

As noted earlier, Julien and O’Brien (2014) observed an increase in the number of studies that focused on the general public, representing yet another shift away from the early stages of information behavior research, where researchers were primarily interested in the work lives of professionals (mainly in scientific fields). Although the “everyday” information needs of individuals may not have initially been viewed as interesting enough to warrant investigation, the emergence of user-centered approaches in information behavior research opened the door to exploring the many different contexts in which we look for and use information. Many information behavior research studies were thus premised on the related notions that “information is subjective, resides in the users’ minds, and is only useful when meaning has been created by the user” (Choo, 1998, 39). And, when we look at information in that way, there is nothing mundane about it.

Another reason for this growing interest in everyday information behavior can be traced to broader social and technological changes that have made information more central to our lives. We now live in an information age, where both the quantity of information available to us and the means by which we can access it are increasing at never-before-seen rates. Information is central to our lives not just at home or at school, but in all aspects of our lives. As described by Aspray and Hayes (2011):

Many of the everyday activities in American life are information activities. Americans gather information from many sources and in many ways. They seek information about major purchases, local sports events, and community activities. They seek political information and information about their heritage and genealogy. They seek information about the best places to vacation and the best schools for their children. They seek information from government sources about a diverse range of topics including health care, social services, visas, recycling, public museums, taxes, government forms, and voter registration. In these and many other ways, everyday life in America is filled with information activity" (p. 2).

Using a rich variety of methods and techniques, researchers around the globe have examined how and why people engage in these activities that punctuate our daily lives. And these researchers, often working with information science professionals in the field, have developed products and services that improve our experiences with seeking and using information.

## **The Development of Information Technology**

The rapid pace of information technological developments opened up new avenues of inquiry in information behavior research and continues to do so today. The monumental ways in which the Internet has impacted how we seek information cannot be overstated, leading information science researchers and professionals to think long and hard about what has changed and what remains the same (Aspray & Hayes, 2011; Spink & Cole, 2006). For example, the way in which high school students conduct research was forever altered with the birth of Wikipedia. Although this undoubtedly was met with skepticism (and maybe even horror!) by educators around the world, it gave way to important studies about information literacy in the twenty-first century.

Indeed, the entire discipline of information science has, in one sense, been the story of the successive absorption of a long series of IT innovations, followed, in each case, by research on the impacts of those innovations, and efforts to improve access to information through optimal design of those innovations. With the excitement generated by each new technology, the relatively stable underlying human behaviors and reactions were sometimes forgotten, and the new technology instead seen as the source of a totally new information seeking landscape. One thing we now know, however, after a lot of research on those successive waves of new technology, is that underlying human propensities with regard to information emerge

again and again, as each new technology becomes familiar and its use second nature (Bates, 2010).

This is something to consider when we delve into the models of information behavior later in the book: Many of these models were developed in the days before the Internet. In particular, it is important to ask ourselves the following question: To what extent (if at all) do we need to modify the different models to take into account the ever-changing information landscape?

## **CONCLUDING THOUGHTS**

As the patterns and trends in information behavior research discussed in this chapter have emerged and evolved, there are two somewhat related issues upon which those entering the broader field of information science should keep their eyes on. Information science, at its core, is an interdisciplinary field, and information behavior researchers have generally recognized the importance of paying attention to research outside of the field that can help us learn more about how people look for and otherwise engage with information (Wilson, 2000). Julien and O'Brien (2014), however, observed something a bit troubling in their most recent review of information behavior literature: Interdisciplinarity (as evidenced by the number of citations to works outside the realm of information behavior) declined from around 50 percent in 2011 to 35 percent. This, according to Julien and O'Brien, "represents a step backward in terms of intellectual growth for the area of information behavior" (p. 247).

A related issue has to do with scholarly communication – remember the example of farmers learning from university researchers? The importance of regular communication between academic researchers and professionals in the field is well understood, but the question of how we actually facilitate this communication has been a rather tricky one to address.

The overarching theme that connects these issues is the need for information behavior research to be connected to the broader field of information science – to researchers in other parts of the field and to

the professionals and practitioners who apply this research to “real world” situations. Vakkari (2008), in his study of papers submitted to a leading conference in information behavior, noted a decrease in the number of papers that articulated their contributions to either research or practice. This does not reflect a lack of connection to other bodies of research or to practice but rather a lack of understanding of the extent to which information behavior research can influence and be influenced by what is going on in other corners of the information science universe. We encourage you to keep this in mind as you read through this book. For example, as you read about different information behavior studies that have been conducted or about specific data collection or analysis techniques, you may want to ask yourself: How can I apply this to what I’m learning about in my other classes? Or to my most recent project at work? You may be surprised at the connections you’re able to make.

## DISCUSSION QUESTIONS

- How can researchers do a better job of sharing their study findings with information science professionals?
- If you were interested in reading information behavior research studies, how would you go about finding them? What search terms would you use?

**Learning Activity:** Go to Google Scholar (<https://scholar.google.com>) and search for an information behavior study that was written before 1980 about a particular population. For example, you might search for the terms “*information behavior*” *historians* and then adjust the date range on the search results page so that the time period covered is up through 1979. If you have difficulty locating a study, try changing “*information behavior*” to the more commonly used phrase “*information seeking*.” Also, adding a term such as “methodology,” “research methods,” and/or “recruitment” can help you to further hone your search results so that you’re likely to identify an actual research study. Browse through your

search results and select one study that you'd like to read. If you have difficulty finding a study, you could choose the 1969 study "Prepurchase Information Seeking Behavior of New Car Purchasers: The Learning Hypothesis" by Peter D. Bennett and Robert M. Mandell (<https://ter.ps/Bennett1969>). As you read the study you've selected, consider how the findings might look if a similar study were conducted today. What might be the same? What might be different?

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## Note

1. Bates (2004) offers a different take, suggesting that the beginning of user-centered research can actually be traced to studies on scholarly communication that were conducted in the 1950s and 1960s (Talja & Hartel, 2007).

# 4

## *Related Concepts*

*As Pierre began to select his classes for next semester, he began with a general Google search for data analytics courses. Skimming the first few search results, he quickly realized that he had forgotten to specify that he was looking for classes that were offered at his university. He added the name of his university to his query, but the new set of search results were still irrelevant, as they were mainly graduate-level classes. He then realized that it would be better to go to his university's website and use their course look-up tool. After completing the required log-in procedure, he entered "data analytics" in the search bar and limited his results to "undergraduate level." He was able to find three courses that he was eligible to sign up for. Later in the day as he played basketball with his friends at the gym, one of them happened to mention taking (and enjoying!) Dr. Q's data analytics course. Ultimately, Pierre signed up for Dr. Q's course and is looking forward to taking it this coming semester.*

\* \* \*

In this chapter, we will explore some of the many other important concepts that relate to people's information behavior. For ease of discussion, these concepts have been organized into the major categories of the overall information behavior environment, information access, information seeking, and information assessment. Within the "overall information behavior environment" section, we will cover two important terms referring to the backdrop against which people's information behaviors unfold – context and situation. We'll then move to information access, covering the concepts of attention, information overload, selective exposure, selective attention, information poverty, and convenience. Next, we'll cover some central concepts relating to information seeking, including Zipf's Principle of Least Effort, satisficing, serendipity, information encountering, berrypicking, information foraging, proxy and collaborative information seeking, and some terms that refer to specific types of information-seeking activities. We'll then move to information assessment, covering the topics of relevance, pertinence, usefulness, and credibility assessment. The chapter will wrap up with a discussion of why these concepts matter and a case study demonstrating the importance of teaching and supporting users in their credibility assessment processes.

## **THE OVERALL INFORMATION BEHAVIOR ENVIRONMENT**

In this section, we will focus on the overall environment in which people's information behaviors take place. The terms "context" and "situation" are frequently used to refer to this concept, and although they're often used interchangeably, there is an important distinction between the two.



**Figure 4.1** Related Concepts Word Cloud

## Context

Imagine that you're observing someone using Google. You see that they've typed the following query: "horses food healthy." You don't know anything about the person (for example, how much do they already know about horses?), about their information need (for example, do they need to know whether a particular food is okay to give to horses?), about their situation (for example, do they own a horse? Did they just adopt this horse?), or about their information goal (for example, are they planning to write a paper for a class, share this information with their grandparent, or use this information to decide what to feed their horse?). Everything that you would be lacking in this scenario has been termed "context." Without knowing anything about an individual's context, it is very difficult to understand their information behavior.

Context is essentially the larger environment in which an individual's information behavior unfolds. Contexts are multidimensional, incorporating personal characteristics of the individual (e.g., their age, their educational attainment, their emotions, their preexisting knowledge on a particular topic); their role (e.g., student, concerned parent, doctor); their current situation; the task they're working on;

and their values and goals. Additionally, contexts are not static – an individual's behaviors, as well as any changes in their larger environment, often alter their context. The concept of context is so complex that it has been called an “unruly beast” (Dervin, 1997) and, as another author pointed out, “Difficulties arise when attempting to exhaustively characterize a context” (Sonnenwald, 1999, 179). Contexts are, indeed, quite complex and messy; however, they are very important to consider when thinking about someone’s information behavior as it is impossible to tease the two apart. A person’s information behaviors take place within a context; furthermore, their information behaviors are shaped by this context and contribute to the shaping of the individual’s future context.

Information behavior researcher Karen Pettigrew (1999) identified one type of context that is particularly fluid. Based on her observations and interviews with nurses and seniors at a community foot care clinic, Pettigrew discovered four types of contextual factors that influenced the patients’ and the nurses’ information behavior, including physical characteristics of the environment (the clinic), activities taking place in the clinic, characteristics of the nurse’s situation, and characteristics of the patient’s situation. She termed the combination of these contextual factors a “grand context.” The interactions of each of these factors led to the development of an “information ground” at the clinic, which she defined as “an environment temporarily created by the behaviour of people who have come together to perform a given task, but from which emerges a social atmosphere that fosters the spontaneous and serendipitous sharing of information” (p. 811). A hair salon can also serve as an information ground. Your purpose in going to the salon may be to get a haircut, but while you’re there, you might overhear other patrons talking about a new restaurant that has opened in the area. What might be some other examples of information grounds that you encounter in your day-to-day life?

## **Situation**

Although the terms “context” and “situation” are frequently used interchangeably within information behavior research (Cool, 2001), situation is actually a much narrower term – a person’s situation unfolds against the backdrop of a much larger context. For example, a major piece of your current context is likely that you are a college student; however, your situation may be that you need to find articles to read for a paper that is due in this class tomorrow. A situation has been defined as “an environing matrix” comprised of people, places, and events (Cool, 2001) and as “the particular set of circumstances from which a need for information arises” (McCreadie & Rice, 1999, 59). Barry (1994) coined the term “information need situation,” pointing out that this construct encompasses “all factors that the user brings to the situation: previous knowledge, awareness of information that is available, affective or emotional factors, the expected use of the information, any time constraints under which the user is working and so on” (p. 149). As with context, observing someone’s information behaviors with no awareness of their current situation – what’s driving them to look for information, how they feel about their information need, what limitations they’re facing – will only yield a birds-eye view, lacking in important detail, richness, and potential usefulness.

## **INFORMATION ACCESS**

Information is of no use to someone unless it is accessible to them. Access can be physical – can I literally get my hands on the information? Access can also be cognitive – can I understand the information once I have it? Perceived accessibility is just as and perhaps even more important than actual accessibility. If you believe that a particular source will be difficult to acquire and/or to understand, how likely will you be to put in the effort required to obtain it? In this section, we will look at some of the major concepts that concern people’s access to information, including attention, information overload, selective exposure, selective attention, information poverty, and convenience.

## **Attention**

Many of us now have unprecedented access to information, particularly with the increasingly widespread availability of the Internet. The fundamental currency of access today is attention – we each have limited attention that we can devote to particular topics and tasks during our day. We have to make important decisions as to how we will distribute this limited resource. If we prioritize a particular problem or task, we will likely devote our attention to obtaining and understanding any information needed for it. On the other hand, if we choose not to devote our attention to a particular topic/task, we will likely not have access to the information we may need.

## **Information Overload**

Our unprecedented access to large amounts of information frequently comes with steep costs. We may find that we have access to so much information that we feel overwhelmed and unable to make good use of it. This situation has been termed “information overload.” Information overload can cause people to engage in information behaviors that may prove problematic, such as simply not processing information (“omission”), processing information but doing so incorrectly (“error”), storing up information so one can process it later (“queueing”), processing only information deemed to be highest priority (“filtering”), or simply giving up and ceasing to pay attention to any input at all (“escaping”) (Miller, 1960). These strategies used to deal with information overload can lead to a range of negative consequences, such as not having needed information, having an incomplete (and perhaps) biased picture of a topic or one’s situation, and making uninformed or misinformed decisions. Information overload can also lead to information anxiety if we feel unable to keep up with and understand all of the information that appears relevant to our topic or situation.

The “vocabulary problem” (Furnas et al., 1987) is one of the most common causes of information overload. This pertains to the frequent mismatches between the words used by an information creator to

describe their document (or even within their documents) and the words used by an information seeker to describe what they are looking for. Google fundamentally relies on the existence of *some* degree of match between these two. For example, you may go to Google and enter the search term “mouse.” Although you may be looking to purchase a computer mouse, your search results are likely to contain websites that pertain to the cheese-eating rodent and, more specifically, to Mickey Mouse. In this case, the vocabulary problem caused precision failure; that is, some of the search results you received were not “precise,” as they did not match your actual information need. The very long set of search results, many of which are irrelevant to you, may cause information overload. The vocabulary problem, however, can also lead you to not retrieve enough information. For example, you may enter the query “doctor” into Google. Because our current-day search engines are very heavily reliant on keyword matching techniques, your search may not retrieve websites that use the term “physician” rather than your search term “doctor.” In this case, the vocabulary problem has caused recall failure; that is, your search failed to “recall” all relevant results. Your search results set is incomplete because it does not include all of the documents that are, in fact, relevant to your query. Thus, the vocabulary problem can cause both precision and recall failures.

Precision and recall are both metrics that are commonly used to calculate the effectiveness of information retrieval systems. Precision is the proportion of retrieved results that are actually relevant; recall is the proportion of relevant results available in the system that are successfully retrieved. For example, let’s say that you have a collection of 100 documents, 12 of which are relevant to your query. You run your query and the system retrieves 10 results, 8 of which are actually relevant. The precision of the system would be 0.80 (8/10) and the recall would be 0.67 (8/12). Although both precision and recall are important, there is frequently a trade-off between them. If you want to obtain more precise results, you may have to accept poorer recall (that is, accept a less comprehensive result set in order to maximize your chances that the documents retrieved will

be highly relevant to your query). In contrast, if your priority is to obtain a comprehensive results set, you may have to accept lower precision (that is, accept that your results set is likely to contain potentially less relevant results). Information retrieval systems with poor precision cause information overload – the user may be inundated with irrelevant search results and may be unable to find the ones that are actually most relevant to their need. In contrast, information retrieval systems with poor recall do not inundate the user with irrelevant information, but they (similarly) fail to provide users with the information they need. Both precision and recall are covered in much more detail in [Chapter 5](#).

## Selective Exposure

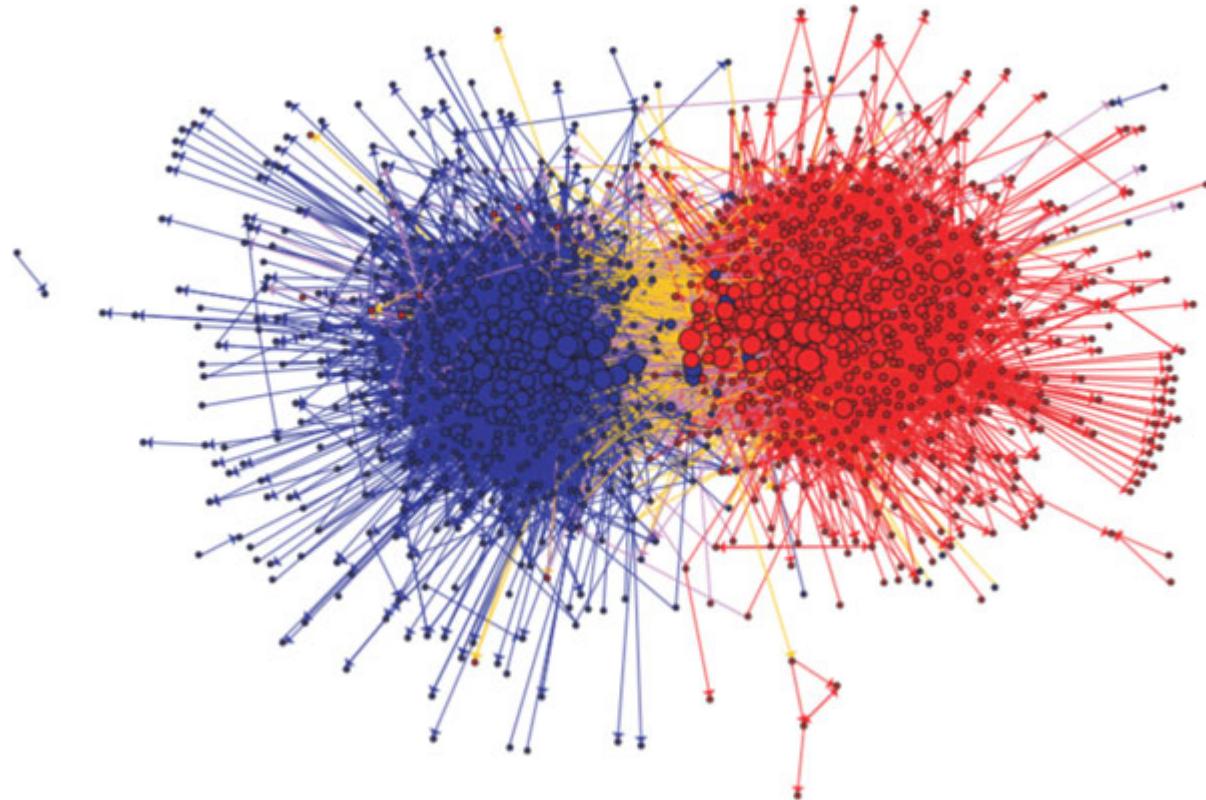
One strategy people may use in an attempt to avoid information overload is called “selective exposure.” Throughout our everyday lives, each of us is exposed to some types of information, but not others. Sometimes people make conscious choices as to which types of information they want to be exposed to. They may even change their behaviors in order to ensure that they’re exposed to some types of information, but not others. Frequently, people tend to look for and be more open to information that confirms what they already believe. This has been called “confirmation bias.”

In one study, researchers (Adamic & Glance, 2005) found extensive evidence of selective exposure. In their analysis of the “political blogosphere” during the two months preceding the 2004 US presidential election, they found that people who write liberal political blogs are more likely to link to other liberal blogs, and that people who write conservative political blogs are more likely to link to other conservative ones. It was relatively rare for a blogger to link to a blog that did not match their own political leaning. In [Figure 4.2](#), the blue dots represent liberal blogs, while the red dots represent conservative blogs. The larger a blog’s dot, the more blogs link to it. Blue lines join two liberal blogs and red lines join two conservative blogs. Orange lines go from a liberal blog to a conservative blog, while purple lines go from a conservative blog to a liberal blog. There

are many red and blue lines, but very few orange and purple lines. These findings suggest that not only were these bloggers likely engaging in selective exposure themselves, but they were also facilitating selective exposure for their readers as well.

## Selective Attention

A concept related to selective exposure is selective attention. Although the former focuses on the universe of information to which you expose yourself, the latter focuses on a subset of that universe, namely, the information to which you actually pay attention. Selective attention involves purposefully choosing to pay attention to some information while ignoring other information. As with selective exposure, people may choose to attend to information that confirms what they already “know” or believe and dismiss everything else. Selective attention, thus, can lead to some of the same types of negative consequences that can be brought about by selective exposure.



**Figure 4.2** The Political Blogosphere and the 2004 US Election: Divided They Blog (Adamic & Glance, 2005)

## Information Poverty

Some individuals and communities are systematically excluded from access to information. “Information poverty” refers to the situation in which an individual or a community systematically lacks physical and/or cognitive access to information (Childers & Post, 1975). Frequently, such individuals and communities are disadvantaged in one or more ways. For example, they may have lower incomes, lower literacy levels, and/or physical disabilities. In addition, they may have less exposure to potentially helpful information within their everyday lives and lack access to tools (such as computers and the Internet) that could enable them to gain greater access to information. People experiencing information poverty may also feel more fatalistic and hopeless; these feelings can reduce their likelihood of seeking information, thereby only reinforcing their information poverty. Information poverty is frequently an iteratively reinforcing cycle that is very difficult to escape. As Dervin (1989) pointed out, “The informationally rich get richer, the poor get poorer” (p. 219).

The Digital Divide is very relevant to this discussion of information poverty. There are systematic differences between those who have computer and Internet access and those who do not. This lack of computer and Internet access tends to be most prevalent among those who are already disadvantaged in some way, such as people who are over the age of 65, have lower incomes, have less education, and/or are disabled (Zickuhr, 2013). Although this gap has shrunk tremendously over time, about 10 percent of US adults still do not use the Internet at all (Anderson, Perrin, Jiang, & Kumar, 2019). A recent survey (Zickuhr, 2013) conducted by the Pew Research Center’s Internet & American Life Project asked 167 US adults who do not use the Internet from their home why they do not do so. For the most part, their reasons for not using the Internet related to information poverty, such as not being able to afford a computer and

Internet service and not having the digital skills they would need to actually use it. However, not all of their reasons related to information poverty – about one-third of the survey participants said they don't use the Internet simply because they don't see its relevance to their daily lives.

## **Convenience**

One final concept that we'll discuss here is convenience. Convenience is important to this discussion of information access, as people frequently prefer to use sources that are easy to access, even if they are fully aware that they are of lower quality. The topic of convenience will be revisited later in this chapter, as it plays an important role during the information assessment stage as well. For our purposes here, one must keep in mind how important both the actual and perceived convenience of information is to a person's access to information. If a resource is, or is perceived to be, inconvenient to access, many people will elect not to spend the extra effort required to obtain and use it. Thus, a lack of (perceived) convenience can be functionally equivalent to a lack of access.

## **INFORMATION SEEKING**

In this section, we'll explore some of the terms commonly used when discussing information seeking. We'll begin with Zipf's Principle of Least Effort and the related term of "satisficing," both of which suggest that people frequently do just enough (information seeking, in this case) to be able to come away with a "good-enough" outcome (information they believe will suffice for their information need and their situation, in this case). We'll then move on to serendipity and information encountering, in which people bump into useful information on a particular topic even though they're not looking for it. Next, we'll talk about two metaphors that have been used to describe information seeking – berrypicking and information foraging. Then we'll move to two more social forms of information seeking – proxy information seeking (looking for information on behalf of someone

else) and collaborative information seeking (jointly looking for information with one or more other people). In the last subsection, we'll explore a few researchers' typologies of the various kinds of information-seeking activities in which people might engage, such as browsing, scanning, and searching.

## **Zipf's Principle of Least Effort and Satisficing**

The last time you looked for information, did you consult *all* of the sources you could possibly think of, ensuring that each one was of the highest possible quality and trying to obtain the most comprehensive and accurate information you could? If so, in this information search, might there have potentially been serious real-life consequences if you failed to get all available information and/or failed to verify the trustworthiness of the information you obtained?

Frequently, people take shortcuts, particularly when they believe that a search for information will not have enormous consequences for them or their loved ones. Zipf's (1949) Principle of Least Effort (also known as "Zipf's Law," for short) holds that people will generally try to minimize the effort they put into a task. However, they usually will attempt to do so not just in the short-term, but actually over the entire time frame of the task. For example, let's say you have a paper due in this class a week from now. You might get on the Internet, search for your topic, scan just the first page of search results (which is very common, but often not very effective!), and then download five of the best-sounding papers so that you can read them later. In this case, you have saved time in the short-term by just scanning the first page of search results (perhaps unwisely). You have also saved time in the long run by spending time now to download the papers so that you don't have to search for them again later.

Information behavior researchers have repeatedly found that people frequently sacrifice credibility for accessibility – they'll go with information they can easily access, even if it's not as credible as information they could obtain if they put in more effort. A term closely related to Zipf's Law of Least Effort is economist and political

scientist Herbert Simon's (1996) concept of satisficing. If you answered yes to the previous question – that you did, in fact, consult all of the sources on your topic and made sure each one was of top quality – you were not satisficing but doing the opposite – optimizing. Satisficing is a merging of the terms “satisfy” and “suffice.” When people satisfice, they find information that is just “good enough” – it may not be comprehensive and it may not even be very high quality; however, the individual feels that it will do, given their present goal and situation. Have you ever felt like you had put enough effort into a particular task and were satisfied enough with your work that you decided to wrap things up, even though it was perhaps not the best you could have done if you had had unlimited time to put into it? This is satisficing – a very common phenomenon in information seeking.

In one study, information behavior researchers (Connaway, Dickey, & Radford, 2011) found extensive evidence of satisficing among college and university faculty, graduate students, and undergraduate students. They found that participants' perceptions regarding the relative convenience of various sources strongly influenced their information-seeking behaviors, within both an academic context and an everyday-life context. Many participants prioritized convenience, turning to sources they believed were easy to access and then feeling sufficiently satisfied if they obtained information they deemed to be “good enough.”

## **Serendipity / Information Encountering**

Have you ever been searching for information on one topic, but happened to come across information on another topic that's also of interest to you? This relatively common occurrence in information seeking has been termed “serendipity” or “information encountering.” There are various types of information-seeking activities that can help to facilitate serendipity. For example, browsing the bookshelves at your local library can lead you to some serendipitous discoveries. Browsing, however, is not required for serendipity. You might notice a billboard on the side of the street that happens to contain information that you have been needing or that you will find useful. Interestingly,

not all information seekers are equally “serendipity prone.” Erdelez (1997) found that some people are “super-encounterers” – individuals who frequently experience information encountering and who regularly rely on it as a strategy in their information behaviors. Erdelez found that super-encounterers differed from her other study participants (those categorized as encounterers, occasional encounterers, or nonencounterers) in that they were more curious, more motivated to explore, and held multiple interests in different subject areas and hobbies. However, Erdelez also found that characteristics of the information environment and of the information itself may also be related to whether or not information encountering actually occurs.

## Berrypicking and Information Foraging

In this section, we'll look at two of the metaphors that have been used to describe information seeking: berrypicking and information foraging. Bates (1989) coined the term “berrypicking” to describe information searches that don't fit with the classic information retrieval model. This model assumes a one-shot query – a user submits a single query to an information retrieval system and the system yields a single set of results matching their query. Bates made the very important point that this model does not adequately characterize many information searches. Frequently, an individual's information needs, queries, search techniques, and the sources they consult all shift as they work to resolve their need for information. Bates pointed out that people often retrieve information a bit at a time, rather than using a one-shot query. She described an “evolving search” in which people may consult one source (“bush”) and obtain pieces of information (“pick berries”) from that source until they choose to move on to the next source (“bush”) in order to obtain pieces of information from the second source (“bush”). If we assume that the berries, in this case, are red, people may choose to move from one bush to other bushes as the bush they're currently picking from becomes less red, relative to the other bushes that they can see within their environment. In other words, people will tend to consult a particular

source until they think another source(s) might prove more useful to them.

Closely related to Bates' (1989) berrypicking, Pirolli and Card (1999) developed information foraging theory. This theory states that people adapt their information-seeking strategies and their information environments to maximize the amount of useful information they can gain per unit cost. In other words, people will use the information-seeking techniques that will lead them to the most useful information for the least amount of effort, and they will adapt their environment (such as their office) to support this goal. For example, if you're writing a paper, you might place the most useful articles in a convenient place on your desk so that you can get to them with minimal effort. As part of information foraging theory, these authors also coined the terms "information scent" and "information diet." A classic example of information scent is Google snippets, which are meant to provide you with information about the information you will reach if you decide to click on a particular link. Information scent provides you with clues about the likely value and cost of a particular piece of information, should you choose to pursue it. The concept of information diet refers to the array of information sources that one chooses to keep at hand. The information diet of an optimal information forager will consist of those information sources that the individual expects will provide them with the most value per unit cost. These costs might be monetary, but they might also refer to the cost to gain access (I have to walk to the library?!), the cost that will be incurred in order to process and make sense of the information (This book is way over my head!), or opportunity costs (What else might I be able to do if I don't spend the time walking over to the library today?). Overall, information foraging theory is fundamentally about how people allocate a scarce resource (their attention) in today's culture of information overload. More specifically, it is about how they strive to maximize the amount of attention they allocate to the information that will be most useful for them.

## **Proxy and Collaborative Information Seeking**

In this section, we look at two social types of information seeking – proxy information seeking and collaborative information seeking. In proxy information seeking, one individual tries to find information for another person's benefit. Has a grandparent ever asked you to look up some topic for them on the Internet? Proxy information seeking is so common, in fact, that one study found that people looking for health information online are more likely to be looking for health information for other people, rather than for themselves (Fox, 2006).

Collaborative information seeking is also quite common. This term is used to describe when two or more people work together to look for information on a particular topic. For example, you and your friend may both look into potential destinations for your upcoming Spring Break. People do not have to be colocated to engage in collaborative information seeking. Continuing our example, you might do some searching and then email your friend a summary of your findings, asking them to look further into one of the locations you've mentioned or to identify other potential vacation spots that you might like to visit.

## Types of Information-Seeking Activities

The concept of information seeking encompasses a wide range of activities, and each of these activities varies along a number of different continua. For example, as mentioned in [Chapter 2](#), information-seeking activities can range from very passive to very active (remember Wilson's (1997) passive attention, passive search, active search, and ongoing search?). In addition, they can range from super-focused to completely exploratory, from very purposeful to more aimless, from strictly serious to completely playful, and from very time-constrained to much more open-ended. In the final portion of this section on information seeking, we will look at a few additional researchers' typologies of different types of information-seeking activities, including Bates' (1989) user search strategies, Ellis' (1989a) information-seeking characteristics, Marchionini's (1995) types of browsing, Choo's (1999) "modes of scanning," and Choo et al.'s (2000) "behavioral modes and moves of information seeking on the Web."

Bates (1989) identified six different search strategies used by scholars and students: (1) footnote chasing, (2) citation searching, (3) journal run, (4) area scanning, (5) subject searches in bibliographies and abstracting and indexing (A&I) services, and (6) author searching. Footnote chasing, or backward chaining, involves scanning the reference lists at the end of relevant articles to identify additional articles of potential interest. In citation searching, or forward chaining, a user looks up a particular citation to find out more recent articles that have cited it. The library database Web of Science facilitates this process through their Cited Reference Search feature. Google Scholar also enables users to conduct forward chaining by simply clicking on the Cited by ## link below the snippet for the item. The journal run technique involves identifying one particular journal that seems highly relevant and then conducting a search just within this journal. Area scanning involves browsing materials that are physically co-located with one another. Have you ever gone to a shelf in the library intending to check out one particular book, but happened to notice other (perhaps even more useful) books on your topic? This example shows that area scanning can (and frequently does) result in serendipitous findings! Subject searches in bibliographies involve looking up your topic in a reference source (whether in the library or online), such as Reader's Guide to Periodical Literature, to identify all of the literature that has been published on your topic within a particular time period. The final strategy – author searching – involves trying to find all material written by one particular author. How would you go about doing this today? Is there an easy way to do this online?

Ellis (1989a) identified six “characteristics” of social scientists’ information-seeking behaviors: (1) starting, (2) chaining, (3) browsing, (4) differentiating, (5) monitoring, and (6) extracting. Social scientists start their search for information in some way, commonly by consulting one of their colleagues. Once they’ve identified some relevant citations, they may engage in backward or forward chaining (as explained in the prior paragraph). They may also engage in browsing, such as by scanning the table of contents of journals in their field, browsing the shelves at the library, and/or looking through

reference sources, such as Reader's Guide to Periodical Literature. Through browsing, a social scientist can develop a familiarity with relevant sources and begin to engage in the next step, differentiation. Differentiating, which is also frequently termed "filtering," involves identifying the sources that are the most relevant to one's area, that adapt the user's preferred approach/perspective, that are prestigious and of high quality, and that provide a suitable treatment of the topic (e.g., highly technical, aimed at a lay audience with limited knowledge on the topic). Monitoring involves activities such as chatting with one's colleagues, signing up for relevant newsletters, joining relevant listservs, subscribing to relevant journals, setting up Google Alerts, and any other actions that enable one to remain up-to-date with new developments in their field. The final characteristic – extracting – involves interacting with your selected sources to extract just the material that's relevant for you.

Based on a review of research focused on browsing, Marchionini (1995) identified three types of browsing that people conduct within electronic environments – undirected, directed, and semi-directed. In undirected browsing, a person looks through a source with no particular goal in mind and no specific focus. An example of undirected browsing is visiting [Amazon.com](#) and just looking through their section called Today's Deals. Directed browsing is much more planned, systematic, and focused. For example, you might go to [Amazon.com](#) with the specific goal of confirming the publication date of a particular textbook. In the middle of these two extremes is semi-directed browsing. With semi-directed browsing, the individual usually has some general goal and is not quite as systematic as in directed browsing. For example, you may go to [Amazon.com](#), search for books on skateboarding, and then look leisurely through the results.

Although Choo's (1999) "modes of scanning" are focused more specifically on the activities in which business managers engage in order to remain up-to-date regarding relevant trends in their external environment and to make well-informed decisions, they are also applicable to information seeking more broadly. Choo coined the umbrella term "environmental scanning" to describe these activities and identified four particular modes of environmental scanning: (1)

undirected viewing, (2) conditioned viewing, (3) informal search, and (4) formal search. Undirected viewing (or “touring”) involves screening large amounts of information from many different types of sources with the goal of simply identifying important areas, issues, and/or signals that suggest potentially relevant changes are occurring. In conditioned viewing (“tracking”), the individual focuses more narrowly on either particular topics or particular types of information. If they notice information that could be impactful for the business, they may move from the more exploratory “viewing” activity to the more focused activity of “searching.” Informal search (“satisficing”) involves actively looking for information about a particular issue; however, the effort put into this activity is “limited and unstructured” (p. 22), aimed primarily at determining whether there is a need to delve more deeply on the topic. A formal search (“retrieving”) is a much more deliberate and structured effort to systematically retrieve detailed information that is more narrowly focused on the particular topic. Formal searches are often restricted to sources that are perceived to be knowledgeable and to provide accurate information.

Based on their analysis of 61 information-seeking episodes identified from interviewing and analyzing the Web Tracker logs of 34 IT specialists, managers, and consulting staff working in a variety of organizations (including a bank, a large utility company, and a consulting firm), Choo et al. (2000) constructed a model of “behavioral modes and moves of information seeking on the Web.” In this model – which we describe in greater detail in [Chapter 12](#) – Choo and colleagues plot his four scanning modes (undirected viewing, conditioned viewing, informal search, and formal search) on one axis and Ellis’ (1989a) six characteristics of information seeking behavior (starting, chaining, browsing, differentiating, monitoring, and extracting), which he refers to as “moves,” along the other.

## INFORMATION ASSESSMENT

Once people gain access to information, they often (though not always!) engage in one or more assessment processes as they look over the information. Initially, people may try to determine whether

the information is relevant to their topic and whether it is pertinent to their information need. They will also try to assess the potential usefulness of the information. In some cases, they also try to assess the credibility of the information and of the source of that information; however, many studies have shown that people frequently value convenience more highly than credibility. That is, people are frequently willing to accept more easily accessible, though less credible, information rather than to expend extra effort trying to find more authoritative information. All of these assessment processes (i.e., relevance, pertinence, usefulness, credibility) are not always performed, are not necessarily performed in this order, and do not necessarily build on one another. For example, information can be deemed useful even if it is not perceived to be relevant or credible – people may find information on a completely different topic to be useful for them. Similarly, people may find a fictionalized story to be useful. The fundamentally important concepts of relevance, pertinence, usefulness, and credibility assessment will be explored in the following subsections.

## **Relevance, Pertinence, and Usefulness**

Although the terms “relevance,” “pertinence,” and “usefulness” are frequently used interchangeably, many information behavior researchers have distinguished between these terms, viewing perceptions of information on a continuum from “relevant” to “most relevant” (“pertinent”) to “not just relevant but actually useful” to the individual. Have you ever found information that was relevant, but not useful, to you? One example might be when you come across information you had needed earlier but have since acquired – this information would be relevant, but not super-useful because it’s not novel or new to you. People’s perceptions regarding the relevance, pertinence, and usefulness of information are critically important, as they influence an individual’s decision as to whether they will actually engage with and potentially make use of information. Furthermore, people’s relevance, pertinence, and usefulness judgments change over time, as their information needs change, their knowledge grows,

and/or their situation and their perceptions of their situation evolve. In this section, we draw on work by information behavior researchers across the past fifty years to explore the meanings that have been given to these three important terms.

Although the concept of relevance has been deemed to be the key notion behind both the emergence of the field of information science (Mizzaro, 1997; Saracevic, 1975, 1996, & 2007) and the very definition of information itself (Borlund, 2003; Furner, 2004), it remains a somewhat elusive concept that is neither fully understood nor agreed upon (Froehlich, 1994; Mizzaro, 1998; Schamber, 1994; Schamber, Eisenberg, & Nilan, 1990). Relevance has been referred to as an “intuitive, primitive, ‘y’know’ notion” (Saracevic, 1975, 324); however, it has also been said that “relevance is not a single notion, but many” (Wilson, 1973, 457). In sum, relevance is a very complex and multifaceted concept.

Think back to a recent time when you were looking for information on a particular topic. How did you determine whether or not the information you had found was relevant for you, given your perceived information need, your current situation, and the goal you had in mind? For information to be relevant to you, what characteristics did it have to have? If you were to go back and look at the information you had found, would your relevance judgments be any different today?

Researchers have identified many different types of relevance. Saracevic (2007) grouped the various types of relevance that had been identified in the information science literature to date into five categories: (1) system or algorithmic relevance, (2) topical or subject relevance, (3) cognitive relevance or pertinence, (4) situational relevance or utility, and (5) affective relevance. Algorithmic relevance is an objective form of relevance, simply referring to whether or not a system accurately retrieves results that match your keywords. This type of relevance does not take the user and their situation into account. Topical relevance is a measure of the degree to which information is “on topic.” Topical relevance can be determined objectively, simply based on the words in a user’s query; however, it can also be determined more subjectively. For example, a user may

enter the query “mouse.” Unbeknownst to observers and to the system, the user may mean the rodent, rather than a computer mouse. Thus, results about computer mice, though algorithmically relevant, are not actually topically relevant for *this* user at *this* time.

The last three types of relevance in Saracevic’s (2007) typology are all subjective. The third type—cognitive relevance (or pertinence)—refers to information that is both novel and understandable to the user. Cognitive relevance is subjective—the user is the only one who can judge whether a given piece of information is new to them and whether they have sufficient background information to be able to understand it. If you are currently taking Calculus I and someone offers you their Calculus IV textbook, how likely is it that the information in this more advanced book will be cognitively relevant (i.e., usable) to you? The fourth type of relevance—situational relevance or utility—refers to the fit between information and a user’s current problem, task, or situation. In the prior example, the Calculus IV book would also lack situational relevance for you. The final type of relevance—affective relevance—really underlies all of the other forms of relevance, as it pertains to the degree of fit between information and a user’s current intents, goals, emotions, and motivations. In fact, Borlund (2003) argued that affective relevance is not an independent form of relevance, as it is “characteristic of all of the subjective types of relevance” (p. 915). If you’re searching the Internet for hopeful stories by people who have beaten a particular disease, would a website containing mortality statistics be affectively relevant for you?

It is important to note that the five types of relevance identified by Saracevic (2007) do not build on one another. For example, information may be topically relevant but not situationally relevant (e.g., information on the topic that is not new to you) and information may be situationally relevant but not topically relevant (e.g., you believe the topic to be “X”, but actually information about “Y” would be more useful to you in your current situation—remember our earlier discussion of incognizance?).

People use different criteria to make their relevance judgments depending on the type of relevance under consideration. Topical relevance, for example, is judged based simply on aboutness – is this document about my topic? Cognitive relevance tends to be judged based on informativeness, novelty, and information quality. Situational relevance usually necessitates weighing the potential usefulness of information given one's particular problem, goal, or situation. Affective relevance judgments may be based on a wide range of factors, such as a person's degree of satisfaction or level of success. All of these criteria – across all five relevance types – involve not just objective judgments about the information itself, but also subjective judgments that take into account characteristics of both the user and the information and how these intersect with one another. Some researchers have used terms such as “user-defined relevance” and “user-based relevance” to emphasize that true relevance is in the eye of the beholder. Barry (1994) explained, “It is the user who ultimately decides if the retrieved documents are useful and in some way satisfy the need that brought the user to the system.” Park (1994) similarly stated:

A user's view of relevance is concerned with the topic of the problem but also includes much more. It involves an individual's goal and task in terms of one's information need in that particular situation (moment): such as why one needs information, for what purpose, and how one will find the information in addition to what one already knows about the problem at hand, what previous experience one has, what stage of research one is in, what time frame exists, what the anticipated product is, and so forth (p. 136).

Not only are there different types of relevance, but there are also various degrees of relevance. In your most recent search for information, perhaps you found one website that was somewhat relevant and another that was very relevant. Some authors (e.g., Kuhlthau, 2004) have used the term “pertinence” to describe the most highly relevant information, stressing that pertinence is subjective and, thus, can only be determined by the individual who holds the information need. Kuhlthau describes, “Pertinence is a determination that information has a more decisive and significant relationship to a topic than relevance and is related to personal information need.

Pertinent information is to the point and contributes to understanding or the solution of a problem" (p. 42). Similarly, Soergel (1994) explained that information is pertinent "if it is topically relevant and if it is appropriate for the person; that is, if the person can understand the document and apply the information gained" (p. 590). Stressing the more subjective nature of pertinence versus relevance, Goffman and Newill (1966) stated, "The difference between relevance and pertinence is that the relevant documents answer the user's query and the pertinent documents answer the user's information need" (p. 22). Pertinence has even been equated with usefulness: "Pertinent documents are those which [a user] finds useful, because they have a bearing on his particular situation" (Kemp, 1974, p. 37).

For information to be useful, it must be both cognitively relevant and situationally relevant for a given individual with a particular information need; that is, it must be understandable and usable by them and it must fit their perceived situation. Wilson (1973) stressed the importance of people's perceptions when he defined situational relevance as "relevance to a particular individual's situation – but to the situation as he sees it, not as others see it or as it 'really' is" (p. 460). A person's perceptions of their own situation are frequently even more important than their actual situation. If your view of your situation means that one piece of information seems relevant to you, while another does not, you're much more likely to engage with and perhaps act on the former and ignore the latter, thus impacting your (actual and perceived) situation, for better or worse. Wilson (1973) coined another term, "significant situational relevance," indicating that situationally relevant information is only significant if "it is new information to the recipient at the time of its receipt" (p. 467). He stressed that, although it is impossible for information systems to do so, "we serve each other as sources of significant situationally relevant information, and do so by virtue of our knowledge of each other's views of the world, preferences, and learning styles" (p. 470).

Some information behavior researchers have used the terms "utility" and "usefulness" interchangeably. According to Saracevic (1975), information that has utility is information that "helps to directly resolve given problems, that directly bears on given actions, and/or

that directly fits into given concerns and interests" (p. 334). Cooper (1973) similarly defined "utility" as a "catch-all concept involving not only topic-relatedness, but also quality, novelty, importance, credibility, and many other things" (p. 92). He further pointed out that "the purpose of a retrieval system is (or at least should be) to retrieve documents that are useful, not merely relevant" (p. 92). Some researchers call for assessments of relevance to incorporate the ultimate impact of information for the individual. Hersh (1994), for example, explained, "Deciding on a definition of relevance depends on the context in which it is being applied ... Topical relevance is useful for certain types of evaluation, and situational relevance is useful for others. Ultimately, however, we must search for measures of relevance and retrieval that enable us to demonstrate an improved outcome resulting from the use of retrieval systems" (p. 202). Similarly, Xu and Chen (2006) defined relevance as "the perceived cognitive and pragmatic impact of the content of a document in relation to the user's problem at hand" (p. 962).

## Credibility Assessment

Like relevance, credibility is a complex, multifaceted construct. Generally, trustworthiness and expertise are recognized as the two main facets of credibility (Metzger, 2007; Rieh, 2010). A number of other concepts have been used to define credibility, including "believability, trustworthiness, fairness, accuracy, trustfulness, factuality, completeness, precision, freedom from bias, objectivity, depth, and informativeness" (Rieh, 2010, p. 1337). Drawing on these concepts, Rieh constructed a three-item typology of credibility consisting of source credibility, message credibility, and media credibility.

- Source credibility pertains to how believable the person providing the information is.
- Message credibility pertains to how believable the information itself is.

- Media credibility pertains to the believability of a particular medium (e.g., TV, newspapers, radio).

Rieh also describes a newer type of media credibility that has sprung up in the past few decades – Web credibility. Web credibility pertains to the believability of information one finds on the Internet.

Another typology of credibility was created by Tseng & Fogg (1999), who coined the term “computer credibility” and defined it as encompassing “presumed credibility,” “reputed credibility,” “surface credibility,” and “experienced credibility.” Presumed credibility refers to when a person deems information to be credible simply based on their preexisting knowledge and assumptions. Reputed credibility involves deeming information credible because of third-party reports, such as endorsements, awards, or referrals. Surface credibility pertains to judging information to be credible on the basis of surface characteristics, such as a website’s design. Experienced credibility has to do with judging information to be credible because of one’s past firsthand experience with a particular information source. Rieh (2010) pointed out that experienced credibility may actually be the most powerful form of credibility “because it derives from people’s interaction with others or with systems over an extended period of time” (p. 1339). Tseng & Fogg (1999) further coined the related term “earned credibility” to refer to a person’s perception of “credibility based on first-hand experience that extends over time” (p. 62).

Most recently, some additional types of credibility assessment that focus on the influence of social endorsement processes have been identified. These include conferred credibility, tabulated credibility, and emergent credibility (Flanagin & Metzger, 2008; Rieh, 2010). Conferred credibility involves trusting (or not trusting) information because one trusts (or does not trust) the indirect source of that information, rather than the information itself or its direct source. For example, people may trust ads that appear at the top of Google search results pages simply because they trust Google. Tabulated credibility involves basing one’s credibility judgments on those of other people (i.e., on aggregated ratings across multiple users’ credibility assessments). Emergent credibility is best exemplified by Wikipedia.

People may trust this information simply because it is a pooled resource created by many different people, reflecting a sort of collective intelligence. The quality of such group-produced information has actually been found to be quite high; Surowiecki (2004) coined the phrase “wisdom of the crowds” to refer to this phenomenon. He recounted an early example in which British scientist Sir Francis Galton observed a crowd of 800 random individuals making guesses as to the weight of a large ox. Although no one individual’s guess was actually very close, when he averaged out all of the guesses, the collective guess was within one pound of the ox’s actual weight of 1,198 pounds!

As mentioned in the preceding section, people consider a wide range of criteria when trying to determine whether or not information is relevant for them. Rieh (2002) pointed out that two such criteria, both related to credibility, tend to be consistently identified in empirical studies of people’s relevance judgments – information quality and cognitive authority (that is, whether information or the source of information is credible and trustworthy). In her study of doctoral students’ and faculty members’ Web page selection behaviors and information quality judgments as they used the Internet to gather information for assigned tasks, Rieh found that her participants expressed information quality using terms such as “good,” “accurate,” “current,” “useful,” and “important” (p. 152); they expressed cognitive authority using terms such as “trustworthy,” “reliable,” “scholarly,” “credible”, “official,” and “authoritative” (p. 153). She emphasized that these two types of judgments – information quality judgments and cognitive authority judgments – are not made independently. A person’s information quality judgments are frequently influenced by their cognitive authority judgements and vice versa.

Based on her study, Rieh (2002) constructed her Model of Judgment of Information Quality and Cognitive Authority. This model shows that people tend to make two different kinds of judgments while searching the Web – predictive judgments and evaluative judgments. When they’re analyzing a search results page, they make predictive judgments as to which links might take them to more credible information. Once they select a link and reach a particular

website, they then make evaluative judgments about the usefulness, trustworthiness, and accuracy of the information they find there. If a person finds that their initial predictive judgment was incorrect, they will likely go back to the previous page or begin a totally new search. Through iteration, people will eventually find that these two types of judgments match, and they may proceed to use the information they have found. They may also engage in a third type of credibility assessment process – verification – in which they consult multiple websites and attempt to identify whether or not there appears to be some consensus on the topic.

To make their credibility judgments, people may rely on a wide variety of cues, such as the surface characteristics of a website (surface credibility) or information regarding the trustworthiness of the source (source credibility). People often try to reduce the cognitive effort required to make credibility judgments by relying on heuristics – general rules of thumb (Rieh, 2010) that have come up with as they've interacted with information and information sources throughout their lives. Observing particular cues may trigger the use of a particular heuristic. For example, you might notice a lot of typos on a website, propelling you to very quickly doubt its credibility.

As more and more content on the Internet is being created by everyday people rather than professionals such as doctors and journalists, the importance of developing, maintaining, and applying credibility assessment skills has grown. The former type of content has been termed “user-generated content” (such as entries on Wikipedia) while the latter type has been referred to as “traditional media content” (St. Jean, Rieh, Yang, & Kim, 2011). The phrases “Web 2.0” and “Participatory Web” are sometimes used to describe the relatively new Internet environment in which nearly anyone can create and post their own content online. Although the proportion of user-generated content (UGC) on the Internet has grown dramatically over the past decade, Internet users do not always make the effort to evaluate the credibility of the information they find online. For example, when using search engines, many users simply select the first search result listed and rarely go beyond the first page of search results (Jansen & Spink, 2006; St. Jean, Taylor, Kodama, &

Subramaniam, 2017; Unkel & Haas, 2017). Subramaniam et al. (2015b) similarly found that young Internet users (ages 10 to 15) rely on word familiarity when selecting search results, clicking on links simply because Web page titles or Google snippets contained words such as “information” and facts”. More generally, many studies have found that people often sacrifice credibility for speed and convenience (e.g., Connaway, Dickey, & Radford, 2011; Rieh & Hilligoss, 2008). If you can obtain a reasonable-sounding answer to your question from the convenience of your own home, would you make the extra effort to ask your professor or visit the library? (Remember the term “satisficing”?!) What types of factors might motivate you to make the extra effort to get more credible information?

There are several ways in which information professionals can help to support users in their credibility assessment processes. For example, public, academic, and school librarians, as well as educators, can work with people to develop the digital literacy skills they need to be able to effectively and efficiently use the Internet to find trustworthy information. User experience professionals can interact directly with specific groups of users in order to find out the types of challenges they encounter when trying to assess credibility online and then design, develop, and test strategies for supporting users to deal more effectively with these challenges. Search engine designers could work on making the search process and the basis of the organization of search results more transparent. In addition, they could add objective types of credibility indicators to search engine results pages, helping users to pick the results that are likely the most credible.

One example of information professionals teaching and supporting young people in their online searching and credibility assessment processes is an after-school program called HackHealth. The goals of this program are to increase the interest of youth in the sciences (and in health, in particular), their confidence in their ability to maintain and/or improve their health, and their understanding of the connections between their health and their everyday health behaviors (such as diet and exercise). In HackHealth, funded by the National Library of Medicine (NLM), university researchers and school

librarians work with socioeconomically disadvantaged middle-school students (ages 10 to 15) on their digital health literacy skills. These skills are necessary to effectively and efficiently obtain accurate health information online. Examples of these skills include coming up with a query that's likely to lead to relevant search results, looking through a set of search results and determining which result(s) are most likely to contain relevant and trustworthy information, and, upon selecting and clicking on a search result, assessing the credibility of the information provided on the website.

In working with HackHealth participants, researchers found that these students encountered several types of challenges when trying to assess the credibility of health information they found online. Sometimes they had difficulty identifying the actual source of information they found online or they incorrectly inferred who the author might be and/or the author's degree of trustworthiness. One student, for example, stated, "The first website I would go to is WebMD because ... it's doctors from Maryland." Another student said that she would not trust the Mayo Clinic website because it sounds like "mayonnaise." HackHealth participants were also confused about the meanings of different top-level domain names (e.g., .com, .org, .edu). Several participants preferred to use .com websites because they believed they were the most popular. These students thought that .com stood for "common" and, thus, believed they were the most commonly used sites. Another challenge was that students sometimes conflated usefulness with credibility. For example, several students felt that websites were automatically credible if they contained pictures or videos, if they could listen to the content read aloud, or if they could read the content in Spanish. Just 15 percent of the HackHealth participants mentioned that they try to verify the information they find online (Subramaniam et al., 2015a).

## **BUT WHY DO ALL OF THESE CONCEPTS MATTER?**

You may be wondering by the end of this chapter why it's important for you to be familiar with all of these concepts. Perhaps the easiest way to see the importance of these concepts is to remove each of

them, in turn, from the information behavior equation. Let's start with the very broad terms of situation and context. Say you're a data analyst trying to make sense of a mountain of data for some particular audience. How successful could you be if the data itself lacks context (e.g., Who created it? Why did they create it? What were their sources?)? Perhaps even more pressing, how successful would you be if you knew nothing about the situation and context of your target audience (e.g., Who are they? What preexisting knowledge do they have? What are they hoping to do with this information?)?

Moving to the information access section of this chapter, would it be possible to design some information resource or service for a particular target audience without knowing their general priorities for allocating their attention across different sources/topics? Would it be potentially problematic if you didn't know which information sources they can access versus those they cannot? Might it also be useful to be aware of techniques that might help your target group to deal with information overload? How about knowing their perceptions regarding convenience? Perhaps using the Internet to obtain information is convenient for you, but it may not be for them.

All of the concepts in this chapter that relate to information seeking tell us a great deal about people's general tendencies when it comes to looking for information. People frequently try to minimize the amount of effort they'll need to expend and, in many situations, are fine with satisficing. They also tend to consult multiple sources, frequently conduct information seeking with and/or on behalf of others, and engage in an array of different types of information-seeking activities. Being aware of these general preferences and behaviors can help you to be a more effective information professional. For example, how might knowing about humans' tendency to satisfice influence how you go about designing or developing a new database for your employer?

Finally, the concepts related to information assessment – relevance, pertinence, usefulness, and credibility assessment – what makes them important? How might knowing that people often (though not always) engage in these assessment processes as they look

through information affect your design of a new search engine? Might there be any steps you could possibly take to support users as they make these types of assessments?

An important factor to keep in mind is that these information assessment processes are less likely to happen (and less likely to have a successful outcome) if an individual doesn't have the requisite skills, such as the ability to accurately evaluate the credibility of information. In [Chapter 5](#), we will look at the important concept of information literacy – an umbrella term that is used to refer to the entire constellation of skills necessary to be able to recognize one's need for information and to find, evaluate, and use information that fits this need.

## DISCUSSION QUESTIONS

- When looking for health information online, what criteria do you use to assess credibility?
- Do you tend to assess the credibility of online information differently depending on whether it is user-generated content or traditional media content? If so, please explain.
- Why do you think so few HackHealth participations engaged in verification?
- Do you ever engage in verification? Why or why not?
- Thinking about the information science career you're hoping to pursue, are there any steps you might take to support people in their credibility assessment processes?

**Learning Activity:** Reread the story at the beginning of this chapter and see which concepts from the chapter you can identify (situation, context, access, convenience, satisficing, Principle of Least Effort, information overload, relevance, situational relevance, serendipity, information encountering, information ground).

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# 5

## *Information Literacy*

*Rachael, a 72-year-old waitress, developed severely painful numbness and weakness in her hands and feet. Figuring the pain was due to some combination of her age catching up with her and the fact that she was on her feet for many hours several days a week, Rachael ignored the pain. Over the following months, the pain and weakness worsened. One day, she noticed that she had an ulcer on one of her feet. As it wasn't painful, Rachael decided she'd just wait for it to heal. After months of discomfort and no sign of healing, Rachael made an appointment to see a doctor. Upon examining her, the doctor identified the problem as diabetic neuropathy and informed her that significant nerve damage had already occurred. Additionally, the ulcer on her foot had become infected and she would likely need to have that foot amputated. Although Rachael knew she had diabetes, she had no idea these new symptoms were connected to this in any way. She was neither aware of the need (nor the urgency of this need) to gather information about these new symptoms. [Barrier: Incognizance]*

*Ben, a 70-year-old chef, developed severe numbness and weakness in his hands and feet. Although he recognized right away the likely connections between these new symptoms and his long-standing diabetes, as well as the need (and the urgency of this need) to gather information about them, Ben did not have health insurance and did not know where to turn, other than paying out of pocket for an expensive visit to his doctor to get this type of information. [Barrier: Unawareness of information sources]*

*Ricardo, a 69-year-old janitor, developed severe numbness and weakness in his hands and feet. Promptly recognizing the likely connections between these new symptoms and his long-standing diabetes, as well as the need (and the urgency of this need) to gather information about them, Ricardo did some searching online. He found many websites with seemingly relevant information, but much of this information conflicted with what he believed he already knew and with the information he found on other websites. Ricardo was unable to tell which information was trustworthy and which was not. He then decided to turn to UpToDate (<https://www.uptodate.com/home/uptodate-subscription-options-patients>), as his doctor had mentioned that this was a very trustworthy source of health information. However, upon visiting their website and conducting a search, he learned he would need to pay for a subscription in order to access much of the information on this site. [Barriers: Lack of access to information; Inability to evaluate the credibility of information]*

*Erin, a 66-year-old housecleaner, developed severe numbness and weakness in her hands and feet. Concerned that these new symptoms were possibly connected to her long-standing diabetes and recognizing the need (and the urgency of this need) to gather information about them, Erin did some searching online. She described her symptoms in a Google search (“numbness weakness feet”) and clicked on the first search result. After reading the first few paragraphs on this site (UPMC Orthopedic Care: <https://www.upmc.com/services/orthopaedics/conditions->*

*treatments/numbness-weakness), Erin concluded that she must just be sleeping in an awkward position. She stopped searching for information and decided to just wait and see whether the numbness and weakness would go away on its own. [Barriers: Inability to understand and evaluate the applicability and credibility of information]*

*Fatima, a 71-year-old cashier, developed severe numbness and weakness in her hands and feet. Promptly recognizing the likely connections between these new symptoms and her long-standing diabetes, as well as the need (and the urgency of this need) to gather information about them, Fatima made an appointment to see her doctor as soon as possible. In the meantime, she did some searching online and quickly learned from MedlinePlus that her symptoms were likely diabetic neuropathy. Armed with these keywords, she did some additional research online, sticking with websites she knew were trustworthy, including Medline Plus (<https://medlineplus.gov>), Healthfinder.gov (<https://healthfinder.gov>), and Mayo Clinic Patient Care & Health Information (<https://www.mayoclinic.org/patient-care-and-health-information>). She also visited her local public library branch and checked out some books on the topic. By the time she saw her doctor a week later, Fatima was quite knowledgeable on the topic. As a result, she was well-prepared for her conversation with her doctor – in fact, she arrived with a list of questions to ask him. After examining her, Fatima's doctor confirmed that she was in the early stages of diabetic neuropathy. He taught her about preventive foot care and referred her to a local physical therapist who could work with her to reduce the numbness and pain she was feeling and to increase her strength. [Success!]*

\* \* \*

Consider the stories of Rachael, Ben, Ricardo, Erin, and Fatima. Although these five individuals are in a similar life stage/situation and

are experiencing the same symptoms, they differ in a very important respect – information literacy. Information literacy is an umbrella term that encompasses Rachael’s incognizance (that is, her unawareness that she has an (urgent) information need); Ben’s lack of awareness of potential information sources that could help fulfill his information need; Ricardo’s inability to evaluate the credibility of information available on the open Web and his inability to gain access to the information that his doctor had told him is trustworthy; Erin’s hastily drawn conclusion after reading only the first few paragraphs of the first website listed in her Google search results, without evaluating the credibility of this site and its information; and, in contrast, Fatima’s very successful navigation of her information need situation. The degree to which a person is information literate (or not) fundamentally shapes their information behaviors and, thus, the ultimate outcomes that result.

In this chapter, we explore the essential concept of information literacy. We first define the term and then delve into the more specific topic of digital literacy and the very relevant application of fake news. Next, we discuss the Association of College and Research Libraries’ “Information Literacy Competency Standards for Higher Education” (2000) and their more recent “Framework for Information Literacy for Higher Education” (2015). We then explore two popular models of information literacy, including Eisenberg and Berkowitz’s (1987) “The Big6 Skills” and the Society of College, National, and University Libraries’ (SCONUL’s) “Seven Pillars of Information Literacy.” We conclude the chapter with a discussion about the important implications of an individual’s information literacy for both their information behaviors and the resulting outcomes, followed by an introduction to a special case of information literacy, health literacy.

## **DEFINING INFORMATION LITERACY**

In an early definition, the American Library Association (ALA) Presidential Committee on Information Literacy (1989) defined an information literate person as someone who is able to recognize when they have an information need and to find, evaluate, and

effectively apply information that fulfills this need. Thus, information literacy encompasses all of the various skills one would need to have in order to be able to:

- effectively and efficiently identify that they have a need for information;
- identify potential sources for the needed information;
- access those sources to find the specific information they need;
- accurately assess the relevance, applicability, credibility, and potential usefulness of both the sources and the information they find; and,
- adapt (if necessary) the information for their personal circumstances/situation and make use of it to achieve some desired state/goal.

This broad range of activities requires a similarly broad array of knowledge and skills, including an awareness of potential sources of information and how to access them, the topical knowledge to understand the information they find, and the ability to evaluate and put applicable and trustworthy information to use in some way.

## DIGITAL LITERACY

One specific type of information literacy that has become increasingly important as we spend more of our time and obtain more of our information online is digital literacy. Digital literacy pertains to the skills one needs in order to find and consume, create, and communicate or share digital content (Heitin, 2016), whether for school, work, or everyday types of tasks. Although digital literacy is a type of information literacy, the two do not necessarily go together; that is, someone who is digitally literate may actually have a low level of information literacy, and someone who is information literate may actually have a low level of digital literacy. An example of the former is a young adult who has been actively using the Internet for most of their lives and who navigates the Web and social media with ease, but who also tends to accept the first search result returned as fact

without trying to evaluate the trustworthiness of the source and/or the content itself. Although this young adult demonstrates digital literacy, they are not information literate. An example of the latter is an older adult who retired in 1995 after having worked as a fact-checker for a major newspaper for several decades, but who has not had a great deal of experience using computers and the Internet. This older adult likely has quite a high level of information literacy, but probably is lacking when it comes to digital literacy due to their more limited experiences navigating and evaluating information online.

One important aspect of digital literacy is the ability to conduct effective and efficient searches for information, both on the open Web (e.g., using Google) and within library databases. Although many of us are very confident in our ability to use search engines, the reality is that we only see what was retrieved – we do not see the (potentially more relevant, more credible, more useful) results that our query did *not* retrieve. Thus, our assessment of our own ability to conduct searches is, in many cases, artificially inflated. In actuality, our search results may be incomplete and/or may contain irrelevant entries. A set of search engine results that is incomplete to some degree is said to be lacking in terms of *recall*; one that contains irrelevant results is said to lack *precision*.

Recall and precision are metrics used to estimate the success of an information retrieval system, such as a search engine, in retrieving a comprehensive and relevant set of search results. They are both calculated using formulas that result in a number between 0 (not at all comprehensive or relevant) and 1 (completely comprehensive or relevant). Recall is a measure of the comprehensiveness of a set of search results – it is the percentage of all relevant results in the system that the search engine actually retrieved. For example, if a system contains 10 relevant items, but only returns 5 of these to the user, the system's recall would be 0.5. Precision, on the other hand, is a measure of the relevance of a set of search results – it is the percentage of all results retrieved that are actually relevant. For example, if a system returns 10 results to the user, but only 8 of them

are actually relevant to the user's query, the system's precision would be 0.8.

There tends to be a trade-off between recall and precision. For example, if you enter a very broad query (e.g., *mice*), you'll likely get a huge number of results (likely very comprehensive), but many of them will probably not be relevant to your actual information need; however, if you enter a very precise query (e.g., *Logitech M325 Wireless Mouse*), you likely will not retrieve a comprehensive set of results— it is possible that you may miss out on other potentially relevant results (e.g., a similar mouse, such as the *Dell WM126 Wireless Optical Mouse*). Depending on your goal, you may wish to maximize recall (for example, perhaps you've invented a new device and you want to make sure that it truly is a novel invention) or precision (for example, you're writing a short essay and need just a few good references that are right on topic). We can become more effective and efficient searchers if we (1) develop an awareness of how search engines work, including the centrality of the two key concepts of *recall* and *precision*, and (2) become familiar with some helpful tips and tricks for conducting better searches both on the open Web and within library databases.

## **Searching On The Open Web (Google)**

Various search engines work in different ways; however, we will focus on Google, as it is currently the predominant search engine worldwide. Google has its own algorithm, PageRank, which Google founders Larry Page and Sergey Brin created in 1996 and named after Larry Page. When you enter a query into Google, this algorithm goes to work, looking for Web pages that mention your query term(s) and giving greater weight to websites that have many incoming links, particularly if those incoming links have high PageRanks (i.e., many incoming links). Google equates links to a particular site to votes for that site, so sites that have more votes (that is, more sites that link to them) will be pushed toward the top of your search results. This process of weighing incoming links is recursive. That is, to determine

whether to return Web page A to you, Google's PageRank algorithm will not only examine A's incoming links (say, B, C, and D); it will also look at B's, C's, and D's incoming links (say E, F, and G) and E's, F's, and G's incoming links, and so on.

The central idea behind Google's PageRank algorithm is to use incoming links to a Web page as a way to approximate its importance or quality (Brin & Page, 1998). The algorithm evaluates pages with the highest PageRanks – the ones with the most incoming links from sites that have the most incoming links from sites that have the most incoming links, and so on – as the “highest quality” pages. Consequently, Google assumes these high-ranking pages are the best choices for the user's query and positions them toward the top of the results list. This can be problematic, however, as poor quality sites may have many incoming links while truly high quality sites may not. Over the years, we have seen instances where people manipulated the PageRank algorithm to try to push particular Web pages toward the top of users' Google search results lists, depending on the user's specific query. This process of purposefully manipulating PageRank has been termed “Google bombing.” Some examples of Google bombing include a 1999 Google bombing campaign that resulted in Google returning Microsoft's home page as the top result when a user entered the query “more evil than Satan” and a 2003 campaign that resulted in Google returning President George W. Bush's biography on the White House website as the top result when a user entered the query “miserable failure” (Bar-Ilan, 2007). Over the past couple of decades, Google has continued its efforts to improve PageRank, aiming to minimize the potential for such abuses and to maximize the relevance and quality of the search results they retrieve for users.

Although Google's search algorithm is not perfect, Google is by far the largest search engine, both in terms of the number of pages it has indexed (that is, the number of pages it has crawled and stored for use in responding to users' queries) and the number of people who use it (Berry, 2020; Clement, 2020). Additionally, it has a very simple interface that many people find appealing and easy to use. Although not widely known, Google supports some advanced search

functionalities that can enable you to improve both the precision and recall of the results you retrieve. Though some of these functions are automated (such as Google's automatic feature that looks not only for the specific query terms you typed, but also for their synonyms), others require a user to take specific action(s). For example, users can search for a phrase by placing quotes around two or more words (e.g., "student information behavior"). Google provides a very helpful guide to both of these functionalities: "Power Searching with Google Quick Reference"

(<https://www.mukilteoschools.org/site/handlers/filedownload.ashx?moduleinstanceid=611&dataid=2820&FileName=AdvancedPowerSearchingQuickReference.pdf>). In **Table 5.1**, we highlight some of Google's advanced search functionalities that we have found to be the most useful in our own searching. We recommend that you also check out Google's Advanced Search page ([https://www.google.com/advanced\\_search](https://www.google.com/advanced_search)), as it can provide you with more guided support in using some of these (and other) advanced search techniques.

**Table 5.1. Examples of Google's Advanced Search Functionalities**

User Goal	Instructions	Example(s)
Search for a phrase	Place keywords between quotation marks	"information behavior"
Look up the definition of a term or concept	Type: define [term/concept]	define google bombing
Limit your search results by date	Click on "Tools" on your search results page, then click on "Any time." Select from past hour, past 24 hours, past week, past month, past year, custom	– Searched for COVID-19 – On search results page, clicked on "Tools" and then clicked on "Any time" – Selected "past 24 hours"
Limit your search to just scholarly literature	Go to Google Scholar: <a href="https://scholar.google.com">https://scholar.google.com</a> and then type in your query	– Went to Google Scholar – Typed "Bates' berrypicking"
Require that a particular	Place a minus sign right	"software engineer" job

keyword(s) NOT appear in each of your search results	before the keyword (with no space between the minus sign and your keyword)	$-Java$
Limit your search to just .gov sites (government sites)	Type in your keyword(s) and then add the following text: <code>site:.gov</code>	<code>efile site:.gov</code>
Limit your search to just .edu sites (educational institution sites)	Type in your keyword(s) and then add the following text: <code>site:.edu</code>	<code>"information behavior"</code> <code>site:.edu</code>
Limit your search to a particular website	Type in your keyword(s) and then add the following text: <code>site:[site name]</code>	<code>"information behavior"</code> <code>site:ischool.umd.edu</code>
Search for items of a particular file type	Type in your keyword(s) and then add the following text: <code>filetype:[file type]</code> [such as .doc, .xlsx, .pdf, .gif, .png (do not include the period, though)]	<code>literacy filetype:pdf</code> <code>libraries filetype:ppt</code>
Search for pages similar to a particular Web page	Type <code>related:[url]</code>	<code>related:ala.org</code> [finds other library professional organizations similar to the American Library Association (ALA)]
Get a cached (previously stored) version of a particular Web page (this can be very handy when a website is down, but you need to access it right away – just be aware that the content may have changed since the time the page was cached)	Type <code>cache:[url]</code>	<code>cache:ischool.umd.edu</code>
Perform a measurement conversion or calculation	Just type what you'd like to do	$34^*56$ $32^*5+8^3$ <i>1 cup in tablespoons</i> <i>30 us \$ in pounds</i> <i>100 Fahrenheit in Celsius</i>
Set up an alert so that Google will send you an email when it crawls a website that contains your selected search term(s)	Go to: <a href="https://www.google.com/alerts">https://www.google.com/alerts</a> and type in your keyword(s). Then click on the "Create Alert" button	Some examples of terms/phrases you might like to set up alerts for: <code>"your name"</code> <code>"information behavior"</code> <code>COVID-19</code>

## Searching in Library Databases

In [Chapter 7](#), you will read more about the specific library databases that are well-known for including information behavior studies, such as Library & Information Science Source; Library and Information Science Abstracts (LISA); Library, Information Science and Technology Abstracts (LISTA); Library Literature and Information Science; ACM (Association for Computing Machinery) Digital Library; and Computer and Information Systems Abstracts (CSA). Some (or perhaps all) of these databases are likely to be accessible to you through your college's or university's library. It is important to be aware that most library databases have powerful search interfaces that enable users to maximize both the precision and the recall of their searches, thereby facilitating their ability to retrieve results sets that are both highly relevant and quite comprehensive.

In the following paragraphs, we introduce you to some of the many tools that are available in most library databases. It is important to keep in mind that the specific conventions users must adhere to in order to activate particular functionalities vary a great deal across different databases/vendors. It is definitely worth your time to take a look at the "help" feature of any database that you will be working with, particularly if you will be working with the database extensively and want to learn techniques that can help you maximize the effectiveness and efficiency of your searches. The functionalities that we will look at in the following subsections are controlled vocabulary, field searching, Boolean operators, proximity searching, truncation and wildcards, and limits. In the final subsection, we will discuss how you might draw on more than one of these tools within a given query in order to maximally optimize the recall and/or precision of your search.

## Controlled Vocabulary

In order to maximize both the recall and precision of the search results they generate, many library databases use *controlled vocabulary*; that is, they use a standardized set of subject headings (sometimes referred to as just "subjects" or as "descriptors") to represent specific concepts. Most library databases that make use of

controlled vocabulary have a thesaurus that users can consult in order to find the appropriate subject heading(s) to use in their query. Information professionals (frequently referred to as “indexers”) tag each article in the database with relevant subject headings so that users can then use these specific terms/phrases to retrieve a relevant set of articles. The power of controlled vocabulary is that it enables you to retrieve all articles on a particular subject by just using the assigned subject heading (that is, guaranteed high recall, or comprehensive results, that are relevant to the subject heading). It is not necessary for you to know all of the synonyms that various authors might have used to refer to the same concept (for example, did the author use the term “doctor” or “physician” or “practitioner” or “clinician” or ...) and explicitly list them in your search – all items that the indexers have deemed to be on that particular topic (whether or not they mention the specific subject term/phrase) will be retrieved for you when you use the official subject heading.

Let’s work through an example. If you go to the database called Library & Information Science Source and do a subject search for “information-seeking behavior,” you will retrieve all results that have been assigned this particular subject heading. It may be the case that the full text of some of the items in your result set do not actually contain the exact phrase “information-seeking behavior”; however, you will be able to retrieve them because the indexers have noticed the relevance of these items to this topic and tagged them with this subject term. In contrast, if you had simply searched for “information-seeking behavior” in all text fields (so occurring anywhere within the full text of documents), you would miss any items that do not explicitly contain this phrase, even though they may be highly relevant to your search.

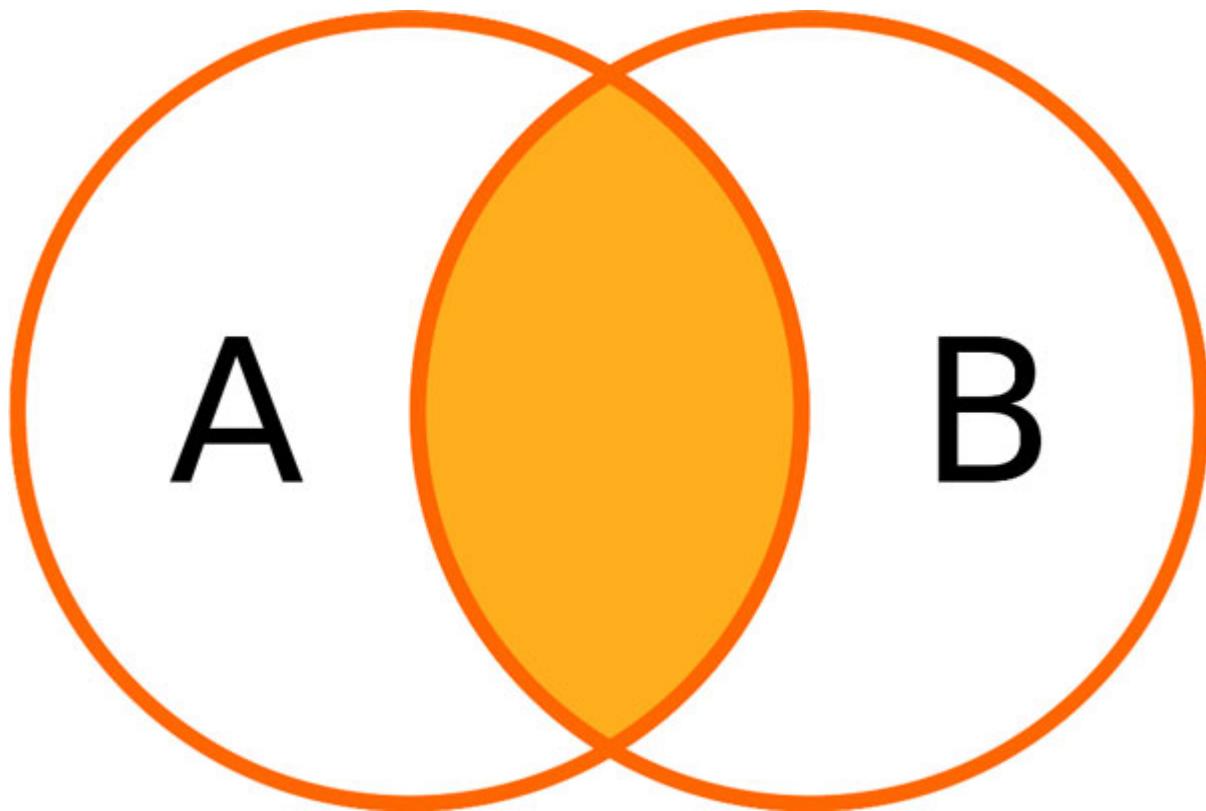
## Field Searching

*Field searching* is a tool that can help you to maximize the precision of your search. Most library databases enable users to search for particular keywords or phrases within particular field(s), such as the author, title, subject, and abstract fields. The power of field searching

is that it enables you to maximize the relevance of your search results and minimize the occurrence of false drops (that is, items that get retrieved for you even though they are not actually relevant to your query). Say, for example, you wanted articles that had been written *about* someone, but not ones written *by* them. You could search for their name in the abstract (abbreviated AB in the Library & Information Science Source database) field (e.g., AB = Belkin), rather than in the author field. Such a search would retrieve articles in which that individual is a central focus (thus, their appearance in the paper's abstract) and would only retrieve articles written by that particular author if the articles were also about them (and thus, perhaps, still of relevance to your search).

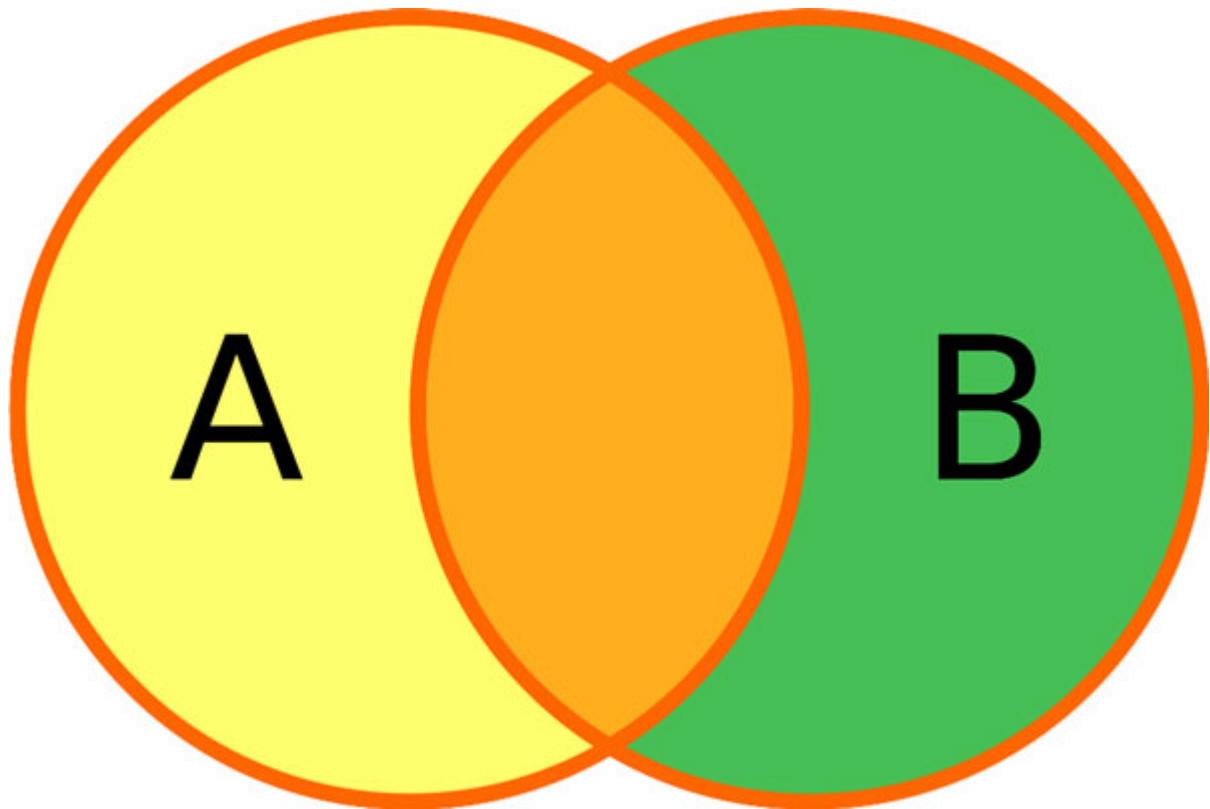
## Boolean Operators

*Boolean operators* are another very powerful tool that can help you to maximize both the recall and precision of your searches. Developed by British mathematician George Boole in the mid-1800s, Boolean logic is fundamental to computer programming and information retrieval today. The basic idea is that one can use a series of gates to include or exclude desired results. Common Boolean operators are the terms AND, OR, and NOT. The “AND” Boolean operator enables you to narrow your search, as it limits your search results to just those items that mention both of your keywords. For example, a query of *students AND “information behavior”* will retrieve articles that mention both students and “information behavior.” It will not retrieve items that mention students, but not “information behavior” nor items that mention “information behavior,” but not students. [Figure 5.1](#) illustrates the Boolean operator “AND” – the query *A AND B* will retrieve all of the items that fall into the shaded area (the intersection of A and B).



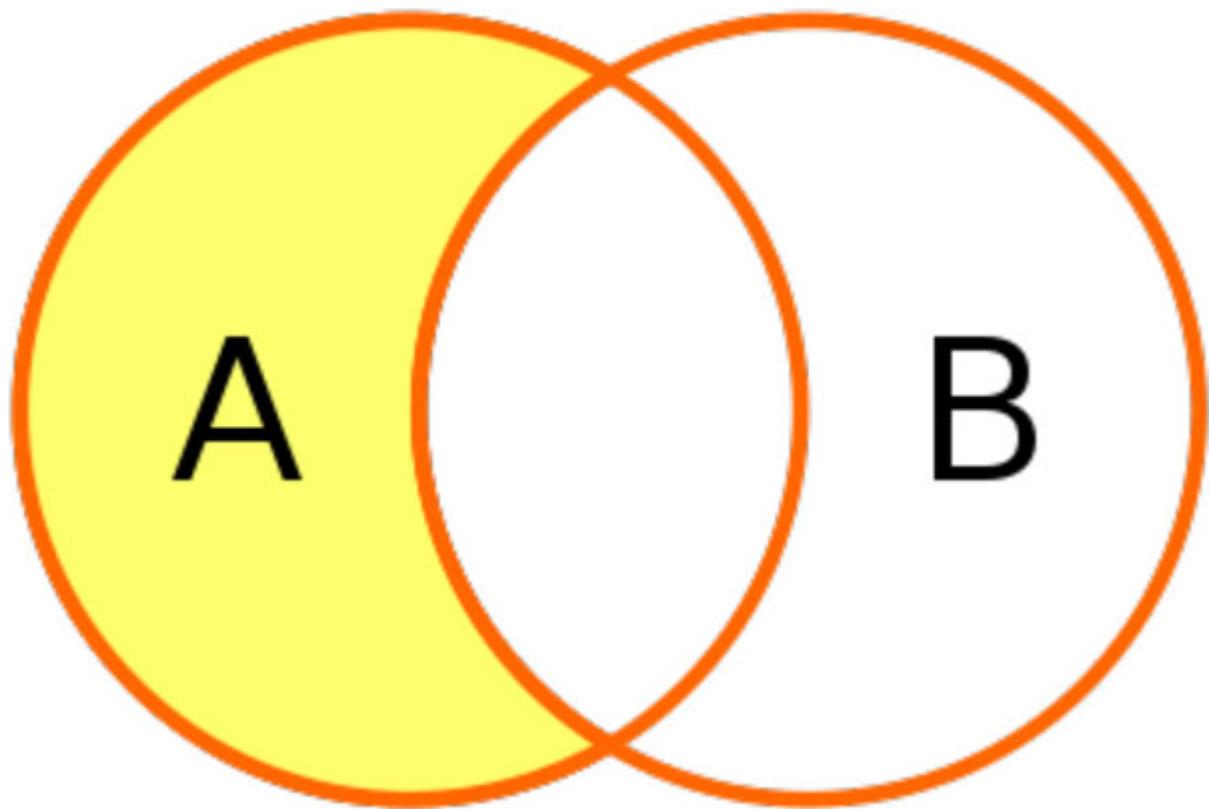
**Figure 5.1** Boolean Operator “AND”

The “OR” Boolean operator enables you to widen your search, as it will retrieve all items that mention either or both of your search terms. For example, a query of “*information needs*” OR “*information behavior*” will retrieve all articles that mention “*information needs*,” as well as those that mention “*information behavior*.” It will also retrieve all articles that mention both “*information needs*” and “*information behavior*.” [Figure 5.2](#) illustrates the Boolean operator “OR” – the query  $A \text{ OR } B$  will retrieve all items that fall in area A, all items that fall in area B, and all items that fall in the intersection of A and B.



**Figure 5.2** Boolean Operator “OR”

A third Boolean operator, “NOT,” enables you to narrow your search, as it will retrieve all items that do not contain particular keyword(s). For example, a query of “*information behavior*” NOT *students* will retrieve articles that contain the phrase “*information behavior*,” but not if they include the word “*students*.” [Figure 5.3](#) illustrates the Boolean operator “NOT” – the query *A NOT B* will retrieve all (and only) items that fall into the shaded area, which is basically *A* (the items that contain word “*A*”) but not *B* (the items that contain the word “*B*”). The intersection of *A* and *B* will not be retrieved. So if you enter “*information behavior*” NOT *students*, you’ll retrieve all items that contain the phrase “*information behavior*,” with the exception of items that also include the word “*students*.”



**Figure 5.3** Boolean Operator “NOT”

In most systems, Boolean operators must be entered in capital letters in order to be recognized as operators rather than search terms. Additionally, most databases evaluate expressions containing Boolean operators in some particular order. Commonly, “NOT” is evaluated first, then “AND,” and then “OR.” However, some databases simply evaluate expressions with Boolean operators from left to right. Regardless, most systems will allow you to control the order in which the operators are evaluated through the use of parentheses. If a query contains multiple sets of parentheses such that some parentheses are nested within others, systems will generally begin with the innermost set of parentheses and move outward. [Table 5.2](#) shows an example of how your query results will differ depending on the order in which the Boolean operators in your query are evaluated and depending on whether or not you use parentheses.

## Proximity Searching

If you want to search for two or more keywords and require that these words appear together (or at least close together), you can use *proximity searching*. Functionally, proximity searching is very similar to the Boolean AND: Your query requires that items contain both(/all) of your keywords; however, you are specifying that these words have to appear together or within a certain number of words of each other. Phrase searching using quotation marks (e.g., “information behavior”) is an example of proximity searching. As mentioned earlier, different databases use different conventions for special functionalities, such as proximity searching. In the Library & Information Science Source database, you can use the operator “N” or “W,” followed by a number to specify the maximum number of words apart your search terms can be and still be included in your results set. You use “N” when the order in which your words appear in the document doesn’t matter to you. If the order does matter, then you’ll need to use “W.” For example, a query of *library N3 jobs* will retrieve all items that contain the words “library” and “jobs” where these words appear (in any order) within three words of each other. A query of *library W3 jobs* will retrieve all items that contain the words “library” and “jobs” but only ones where these words appear in this order (library first, then jobs) and within three words of each other. Please be sure to check the help section of the particular database you’re working with to learn which specific proximity operators they use and how they’ve defined how each of them functions.

**Table 5.2. Boolean Operators: Orders of Operations and How They Impact Query Results**

Goal: I want to retrieve all articles that describe studies of children's health-related information behavior; however, I do not want such studies about older children (teens or adolescents).			
Query	Evaluation Order	Results	Will this query return the results (and only the results) you're seeking?
health AND "information behavior" AND children AND youth NOT teens OR adolescents	NOT, then AND, then OR	Items that contain "youth" but do not contain "teens" and contain both "health" and "information behavior," combined with <b>any items that contain "adolescents" (whether or not they're about information behavior)</b>	No - your results set will lack precision.
health AND "information behavior" AND children AND youth NOT teens OR adolescents	Left to right	Items that contain "health" and "information behavior" and either/both "children" and "youth" → exclude any of these results that contain "teens," combined with <b>any items that contain "adolescents" (whether or not they're about information behavior)</b>	Your results set will lack precision.
health AND "information behavior" AND ((children OR youth) NOT (teens OR adolescents))	Going by parentheses (expressions in innermost parentheses are evaluated first)	Items that contain "health" and "information behavior" and "children" and/or "youth" (but exclude any results that contain "teens" and/or "adolescents")	Yes - using parentheses allows you to disambiguate your query so that you get the results that you want regardless of the evaluation strategy used by the database

## Truncation and Wildcards

*Truncation* enables you to improve the recall of your search by retrieving all items that begin with a particular word stem. The Library & Information Science Source database uses an asterisk for truncation (e.g., *librar\** will retrieve library, libraries, librarian, and librarians). To be more precise in your truncation, you can use wildcards. Each wildcard takes the place of exactly one letter. In the Library & Information Science Source database, you use the question mark for wildcards. So a query of *fr??d* would retrieve freed and fried, but not friend (because you would need to have three question marks to retrieve this longer word). Library & Information Science Source has another special type of wildcard called a hash ("#") wildcard. You use a hash wildcard when you want to retrieve variant spellings of a particular word. For example, *colo#r* will retrieve both color and colour. Please be sure to check the help section for the particular database you're using, though, as they may use different symbols or they may use these same symbols but define their functionality differently.

## Limits

When your query retrieves many results, it can be helpful to use a database's *limit* functionalities to refine your result set. Library & Information Science Source, for example, enables you to limit your results to just those articles that have been peer reviewed, that have been indexed with particular subject term(s), that have been published within a particular time period, that appear in a particular journal, that have been published by a particular publisher, or that have been written in English.

## Combining Tools

To improve the recall and/or precision of your searches, you can combine multiple tools within a given query. For example, you can use proximity searching, Boolean operators, and truncation. The query *(Digital OR Health) W1 Litera\** would retrieve items that contain the phrases “digital literacy,” “health literacy,” “digital literature,” “health literature,” etc. Similarly, you could combine field searching, Boolean operators, and controlled vocabulary. The query *((AU = Belkin) OR (AU = Dervin)) AND SU = information-seeking behavior* would retrieve items written by Belkin and/or Dervin (“AU” is the abbreviation for author in the Library & Information Science Source database) on the subject (“SU” is the abbreviation for subject in this database) of information-seeking behavior.

## FAKE NEWS

Inadequate information and digital literacy skills can contribute to the proliferation of fake news. Fake news encompasses both misinformation and disinformation, where the latter refers to false news that is intentionally communicated in order to deceive the reader. The anti-vax (anti-vaccination) movement is a classic example of fake news and the potentially devastating consequences that can result. In 1998, Dr. Andrew Wakefield and colleagues published a study claiming to prove that the MMR (measles, mumps, rubella)

vaccine causes autism in children. About six years later, it came to light that Dr. Wakefield had a conflict of interest in conducting this study, as he had a lucrative contract with lawyers who were seeking to sue the companies that produce these vaccines. In 2010, Wakefield's 1998 article was withdrawn, and he was no longer allowed to practice medicine in the United Kingdom. In the intervening twelve years and even continuing up to this day, however, many parents ("anti-vaxxers") are foregoing important vaccinations for their children in light of Wakefield's "findings" and are continuing to share this false information both online and off. This has led to the outbreak of diseases such as measles that have been under control in the United States and the United Kingdom for many decades.

In this example of fake news, the spread of misinformation and the tendency of many people to uncritically accept information as truth and to sometimes even act on it formed a lethal combination, as many children were injured, became hospitalized, or even died as a result (Poland & Spier, 2010). Fake news is fundamentally related to information literacy, because a person who is more information literate will be more likely to critically engage with sources and information and be better able to correctly identify fake news. In contrast, someone who is less information literate may be more likely to not only accept what they read without question and to perhaps act on it, but also to contribute to the (often exponential) spread of misinformation and/or disinformation online. But what do we mean when we talk about a "more information literate person" and a "less information literate person" – what are the specific skills that define an information literate person? To answer these questions, we devote the next few sections to describing some of the major standards, frameworks, and models of information literacy.

## **ACRL FRAMEWORK FOR INFORMATION LITERACY FOR HIGHER EDUCATION**

In 2000, the Association of College & Research Libraries (ACRL), a division of the American Library Association (ALA), published

“Information Literacy Competency Standards for Higher Education,” outlining the competencies that students need to be information literate (ACRL, 2000). These competencies consist of five standards, along with the specific criteria that can be used to assess whether or not a student has achieved each individual competency, as well as the outcomes that would result if the student does successfully achieve the competency. To accomplish Standard One, a student must be able to determine what specific information, and how much information, they need. Standard Two calls for the student to be able to effectively and efficiently access the information they need. To meet Standard Three, a student must be able to critically evaluate information, as well as the source of the information, and incorporate the information they select into their knowledge base. For Standard Four, a student must be able to effectively use information in order to achieve some particular purpose. Standard Five calls for a student to comprehend important legal, economic, and social issues that relate to information use and to ensure that their information use is both ethical and legal (such as citing one’s sources and complying with copyright laws).

Fifteen years later, ACRL (2015) released their “Framework for Information Literacy for Higher Education,” replacing their earlier “Information Literacy Competency Standards for Higher Education” to factor in the many changes that had taken place in the higher education environment and, more broadly, in our information environment as a society. ACRL opted to develop a framework, rather than a revised set of competencies, in order to build in more flexibility. Their Framework consists of six frames:

1. Authority is constructed and contextual;
2. Information creation as a process;
3. Information has value;
4. Research as inquiry;
5. Scholarship as conversation; and
6. Searching as strategic exploration.

Each of these frames consists of a set of dispositions (the attitudes and approaches of an information literate person) and a set of knowledge practices (the sets of related skills an information literate person possesses). **Table 5.3** outlines and defines each of the six frames and provides a few examples of the related knowledge practices and dispositions adopted by information literate learners.

**Table 5.3. Framework for Information Literacy for Higher Education (Filed by the ACRL Board on February 2, 2015; Adopted by the ACRL Board, January 11, 2016) (ACRL, 2015, pp. 4–9)**

Frame	Definition	Sample Knowledge Practices	Sample Dispositions
1. Authority is constructed and contextual	Information resources reflect their creators' expertise and credibility, and are evaluated based on the information need and the context in which the information will be used. Authority is constructed in that various communities may recognize different types of authority. It is contextual in that the information need may help to determine the level of authority required.	<ul style="list-style-type: none"> <li>Define different types of authority, such as subject expertise (e.g., scholarship), societal position (e.g., public office or title), or special experience (participating in a historic event)</li> <li>Use research tools and indicators of authority to determine the credibility of sources, understanding the elements that might temper this credibility</li> <li>Recognize that authoritative content may be packaged formally or informally and may include sources of all media types</li> </ul>	<ul style="list-style-type: none"> <li>Develop and maintain an open mind when encountering varied and sometimes conflicting perspectives</li> <li>Motivate themselves to find authoritative sources, recognizing that authority may be conferred or manifested in unexpected ways</li> <li>Question traditional notions of granting authority and recognize the value of diverse ideas and worldviews</li> </ul>
2. Information creation as a process	Information in any format is produced to convey a message and is shared via a selected delivery method. The iterative processes of researching, creating, revising, and disseminating information vary, and the resulting product reflects these differences.	<ul style="list-style-type: none"> <li>Assess the fit between an information product's creation process and a particular information need</li> <li>Recognize that information may be perceived differently based on the format in which it is packaged</li> <li>Monitor the value that is placed upon different types of information products in varying contexts</li> <li>Develop, in their own creation processes, an understanding that their choices impact the purposes for which the information product will be used and the message it conveys</li> </ul>	<ul style="list-style-type: none"> <li>Value the process of matching an information need with an appropriate product</li> <li>Accept the ambiguity surrounding the potential value of information creation expressed in emerging formats or modes</li> <li>Resist the tendency to equate format with the underlying creation process</li> <li>Understand that different methods of information dissemination with different purposes are available for their use</li> </ul>

3. Information has value	<p>Information possesses several dimensions of value, including as a commodity, as a means of education, as a means to influence, and as a means of negotiating and understanding the world. Legal and socioeconomic interests influence information production and dissemination.</p>	<ul style="list-style-type: none"> <li>• Give credit to the original ideas of others through proper attribution and citation</li> <li>• Articulate the purpose and distinguishing characteristics of copyright, fair use, open access, and the public domain</li> <li>• Understand how and why some individuals or groups of individuals may be underrepresented or systematically marginalized within the systems that produce and disseminate information</li> <li>• Recognize issues of access or lack of access to information sources</li> <li>• Make informed choices regarding their online actions in full awareness of issues related to privacy and the commodification of personal information</li> </ul>	<ul style="list-style-type: none"> <li>• Respect the original ideas of others</li> <li>• Value the skills, time, and effort needed to produce knowledge</li> <li>• See themselves as contributors to the information marketplace rather than only consumers of it</li> <li>• Are inclined to examine their own information privilege</li> </ul>
4. Research as inquiry	<p>Research is iterative and depends upon asking increasingly complex or new questions whose answers in turn develop additional questions or lines of inquiry in any field.</p>	<ul style="list-style-type: none"> <li>• Formulate questions for research based on information gaps or on reexamination of existing, possibly conflicting, information</li> <li>• Use various research methods, based on need, circumstance, and type of inquiry</li> <li>• Monitor gathered information and assess for gaps or weaknesses</li> <li>• Synthesize ideas gathered from multiple sources</li> <li>• Draw reasonable conclusions based on the analysis and interpretation of information</li> </ul>	<ul style="list-style-type: none"> <li>• Consider research as open-ended exploration and engagement with information</li> <li>• Maintain an open mind and a critical stance</li> <li>• Value persistence, adaptability, and flexibility and recognize that ambiguity can benefit the research process</li> <li>• Follow ethical and legal guidelines in gathering and using information</li> </ul>
5. Scholarship as conversation	<p>Communities of scholars, researchers, or professionals engage in sustained discourse with new insights and discoveries occurring over time as a result of varied perspectives and interpretations.</p>	<ul style="list-style-type: none"> <li>• Cite the contributing work of others in their own information production</li> <li>• Contribute to scholarly conversation at an appropriate level, such as local online community, guided discussion, undergraduate research journal, conference presentation/poster session</li> <li>• Identify barriers to entering scholarly conversation via various venues</li> <li>• Critically evaluate contributions made by others in participatory information environments</li> </ul>	<ul style="list-style-type: none"> <li>• Seek out conversations taking place in their research area</li> <li>• See themselves as contributors to scholarship rather than only consumers of it</li> <li>• Understand the responsibility that comes with entering the conversation through participatory channels</li> <li>• Value user-generated content and evaluate contributions made by others</li> </ul>
6. Searching as strategic exploration	<p>Searching for information is often nonlinear and iterative, requiring the evaluation of a range of information sources and the mental flexibility to pursue alternate avenues as new understanding develops.</p>	<ul style="list-style-type: none"> <li>• Determine the initial scope of the task required to meet their information needs</li> <li>• Match information needs and search strategies to search tools</li> <li>• Design and refine needs and search strategies as necessary, based on search results</li> <li>• Understand how information systems (i.e., collections of recorded information) are organized in order to access relevant information</li> <li>• Use different types of searching language (e.g., controlled vocabulary, keywords, natural language) appropriately</li> <li>• Manage searching processes and results effectively</li> </ul>	<ul style="list-style-type: none"> <li>• Exhibit mental flexibility and creativity</li> <li>• Understand that first attempts at searching do not always produce adequate results</li> <li>• Seek guidance from experts, such as librarians, researchers, and professionals</li> <li>• Recognize the value of browsing and other serendipitous methods of information gathering</li> <li>• Persist in the face of search challenges, and know when they have enough information to complete the information task</li> </ul>

## THE BIG6 SKILLS

Predating the ACRL Standards (2000) and Framework (2015) but continuing in common usage is The Big6 Skills ([Figure 5.4](#)), a process model describing information problem solving. Developed by Eisenberg and Berkowitz in 1987, this model outlines the process people follow to solve an information problem. More specifically, the model breaks down this process into six stages and specifies the various types of skills that one needs to successfully complete each stage. The stages include (1) Task definition, (2) Information-seeking strategies, (3) Location and access, (4) Use of information, (5) Synthesis, and (6) Evaluation.

# The Big6™ Skills

The Big6 is a process model of how people of all ages solve an information problem.



- 1. Task Definition**
  - 1.1 Define the information problem
  - 1.2 Identify information needed (to solve the information problem)
    - o What is my current task?
    - o What are some topics or questions I need to answer?
    - o What information will I need?
- 2. Information Seeking Strategies**
  - 2.1 Determine all possible sources (brainstorm)
  - 2.2 Select the best sources
    - o What are all the possible sources to check?
    - o What are the best sources of information for this task?
- 3. Location and Access**
  - 3.1 Locate sources (intellectually and physically)
  - 3.2 Find information within sources
    - o Where can I find these sources?
    - o Where can I find the information in the source?
- 4. Use of Information**
  - 4.1 Engage (e.g., read, hear, view, touch)
  - 4.2 Extract relevant information
    - o What information do I expect to find in this source?
    - o What information from the source is useful?
- 5. Synthesis**
  - 5.1 Organize from multiple sources
  - 5.2 Present the information
    - o How will I organize my information?
    - o How should I present my information?
- 6. Evaluation**
  - 6.1 Judge the product (effectiveness)
  - 6.2 Judge the process (efficiency)
    - o Did I do what was required?
    - o Did I complete each of the Big6 Stages efficiently?

**Figure 5.4** The Big6 Skills (Eisenberg & Berkowitz, 1987)

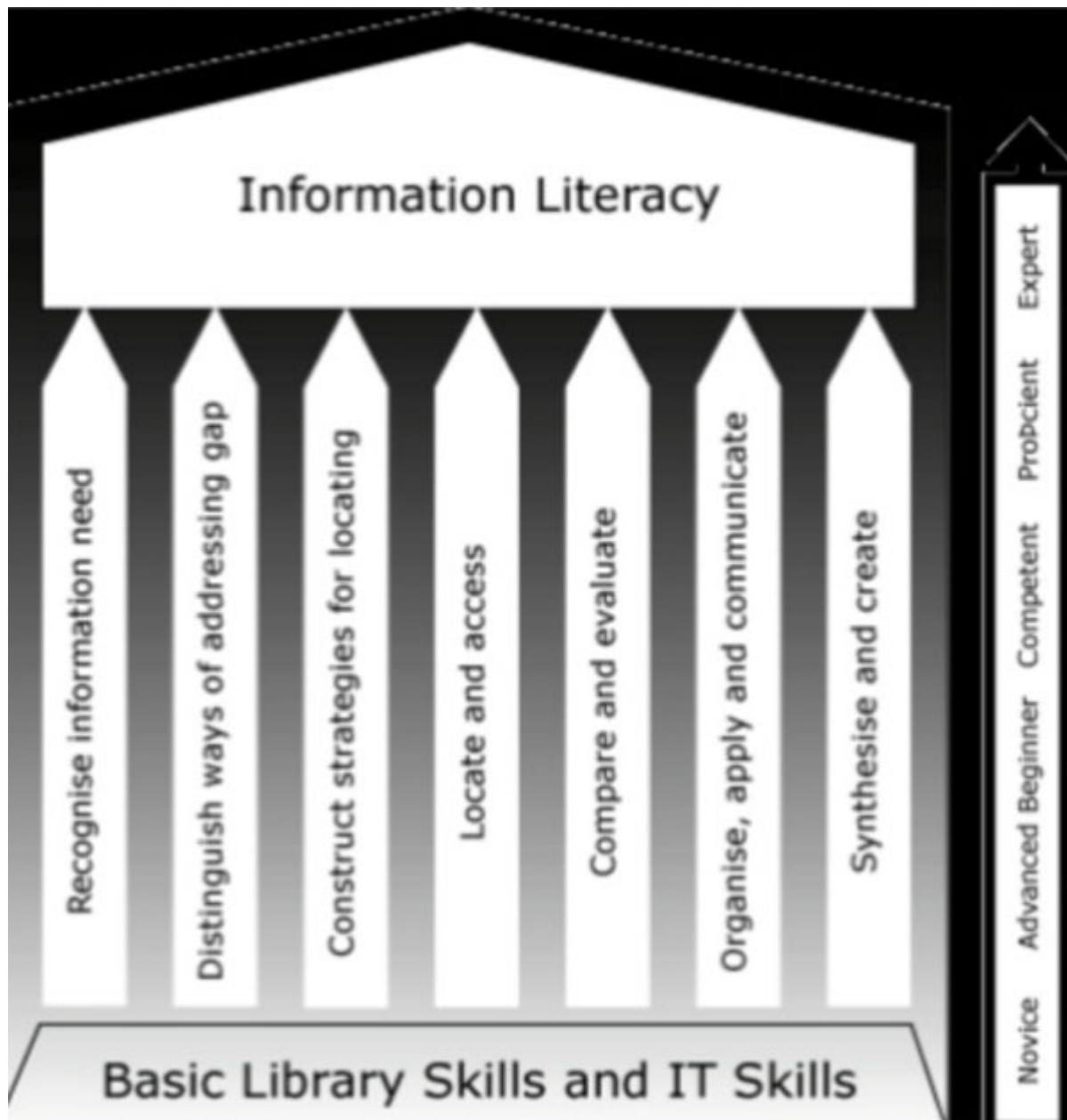
Although the stages in The Big6 Skills model are portrayed in a linear fashion, Eisenberg (2008) points out that people may complete

these stages in any order and that people may return to and/or repeat earlier stages throughout the information problem-solving process. For example, when an individual is in stage 4 ("Use of information"), they may find that the sources they gathered do not actually contain the information they need and, thus, may need to go back to stage 2 ("Information-seeking strategies") or stage 3 ("Location and access"), or maybe even stage 1 ("Task definition"). Although this model has been very widely used in K-12 education throughout the world, Eisenberg emphasizes that it is much more widely applicable to anyone who is trying to deal with an information problem or who is engaging with information in order to reach some type of decision in their personal or professional life. Think back to the process you used to choose which college or university to attend. Do these stages seem to fit how you went about researching the various colleges and universities that were of interest to you and how you ultimately came to your decision?

## **SCONUL'S SEVEN PILLARS OF INFORMATION LITERACY**

Another information literacy model was developed by the SCONUL (Society of College, National, and University Libraries) Advisory Committee on Information Literacy (1999), a professional organization representing all university libraries in the United Kingdom and Ireland. Their model, the Seven Pillars of Information Literacy ([Figure 5.5](#)), depicts the specific library and information technology skills students need in order to be considered "information literate." These pillars, depicted as parallel, independent beams holding up a building and shown as ranging from novice at the base of the pillar through expert at the top of the pillar, represent the abilities to (1) Recognize an information need; (2) Distinguish ways of addressing the gap in one's knowledge; (3) Construct strategies for locating information; (4) Locate and access information; (5) Compare and evaluate information from diverse sources; (6) Organize, apply, and communicate information to other people in ways that are situationally

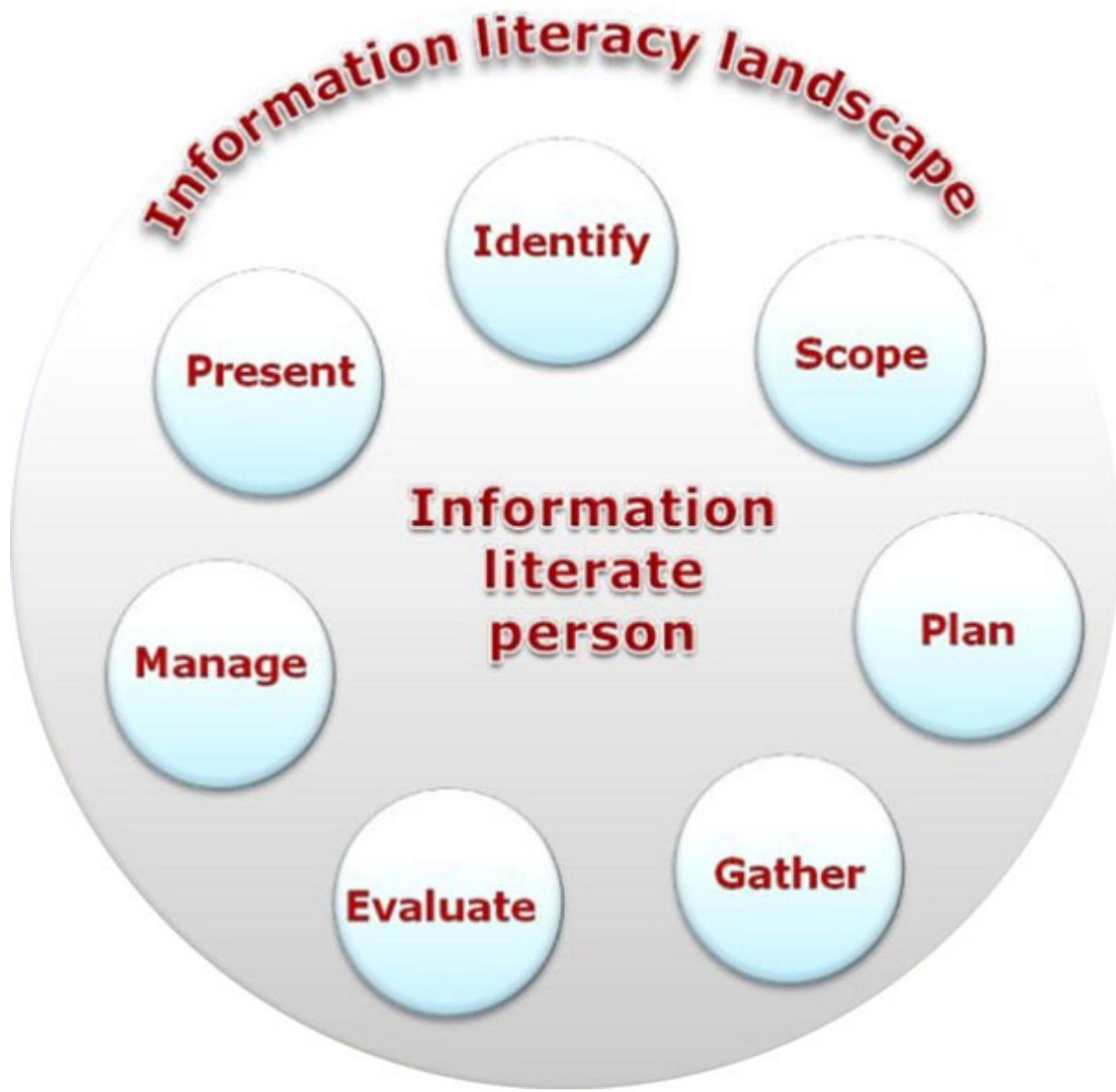
appropriate; and (7) Synthesize and build on information, thereby helping to create new knowledge. Basic library skills and IT skills are shown as the foundations underlying the seven pillars.



**Figure 5.5** SCONUL 1999 Seven Pillars of Information Literacy Model (Bent & Stubbings, 2011)

More recently, the SCONUL Working Group on Information Literacy (2011) defined an information literate person as someone

who is aware of how they go about gathering, managing, synthesizing, and creating information/data and who has the necessary skills in order to be able to engage in these activities. The authors also point out that information literacy is “an umbrella term which encompasses concepts such as digital, visual and media literacies, academic literacy, information handling, information skills, data curation and data management” (p. 3). In this later publication, the SCONUL Working Group on Information Literacy updated and expanded the 1999 Seven Pillars Model (see [Figure 5.6](#)). Their new model is depicted as a circle in order to emphasize that people rarely develop information literacy skills in a completely linear and completely independent fashion, as their original model had implied; however, the authors point out that people’s development of different literacy skills are, in fact, frequently closely linked. The seven pillars in their new model represent the abilities to (1) Identify (identify an information need), (2) Scope (evaluate one’s knowledge and identify gaps), (3) Plan (devise strategies to find information/data), (4) Gather (find and access the information/data one needs), (5) Evaluate (compare and evaluate the information/data one finds), (6) Manage (organize information to ensure that its usable and handle and disseminate information in an ethical manner), and (7) Present (make use of information, whether by synthesizing it, applying it, presenting it, using it to create and disseminate new information, etc.).



**Figure 5.6** SCONUL (2011) Seven Pillars of Information Literacy Model (Bent & Stubbings, 2011)

## IMPLICATIONS OF INFORMATION LITERACY

Why is information literacy important? The degree to which an individual is information literate (or not) can have enormous implications for nearly every aspect of their life. Someone who is more information literate is likely to be better able to gain access to more information and higher quality information. As a result, they are

much more likely to be able to gain awareness of and take advantage of more potential opportunities throughout their lives. Going back to our examples at the beginning of this chapter, Rachael's, Ben's, Ricardo's, and Erin's limited information literacy levels are likely to lead them to poor (or at least suboptimal) health outcomes. Only Fatima will likely be able to obtain the best possible health outcomes, given her situation.

## THE SPECIAL CASE OF HEALTH LITERACY

As mentioned earlier, information literacy encompasses many different types of literacies, including not only basic literacy (reading and writing ability), but also digital literacy, visual literacy (ability to understand information that is communicated through pictures/visualizations), numeracy (ability to understand and work with numbers), media literacy (ability to access, evaluate, use, and create information using various types of media), etc. One crucial type of information literacy pertains to people's information-related skills within the context of their own health, or "health literacy." Health literacy has been defined as: "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health care decisions" (Ratzan & Parker, 2000). Although this definition seems to suggest that health literacy is simply information literacy within the context of health, it is actually much more complex, encompassing people's ability, motivation, and self-efficacy (one's confidence in one's own ability to engage in particular action(s)) to seek, access, and evaluate health-related information, set health-related goals, make sound health-related decisions, and put these decisions into action. The term "digital health literacy," or alternatively "e-health literacy," has been coined to refer to the specific skills one needs to find trustworthy health information online.

Unfortunately, having insufficient health literacy is common, potentially dangerous, and contributes to the likelihood of disadvantaged populations disproportionately experiencing preventable poor health outcomes. Nearly 90 percent of US adults

have a below-proficient level of health literacy (Kutner et al., 2006), and low health literacy levels are more prevalent among older, minority, immigrant, and low-income populations (NN/LM, n.d.). Limited levels of health literacy are dangerous, as they have been found to correlate with poorer health outcomes. Studies have shown that people with low health literacy levels are less likely to get preventative care (such as flu shots) and to take medicines as directed, and are more likely to report they're in poor health, to be hospitalized, and to have poor disease outcomes (NN/LM, n.d.). Health literacy appears to play a very central role not only in individuals' health outcomes, but also in the creation and maintenance of health disparities (the tendency for some populations, such as minority, poorer, and less well-educated populations, to suffer poorer health outcomes than others, despite the fact that these differences are preventable). One researcher (Weiss, 2007) found, in fact, that health literacy is a stronger predictor of one's health than one's age, race, educational attainment, employment status, and income.

## DISCUSSION QUESTIONS

- How would you describe the interrelationships between information literacy and information behavior?
- Have you ever received any explicit training relating to information literacy skills? For example, did one of your high school teachers perhaps instruct you on how to evaluate the credibility of online resources? Or did your school or public librarian offer a class on identifying fake news? Or did you perhaps take a freshman-level class on library skills at your college or university library when you first arrived on campus?
- Five students who are completing their last semester of college apply for an entry-level job and secure a first-round interview. Drawing on their information literacy skills, they use various methods to prepare for and participate in the interview. How would you rate each of these student's information literacy levels – novice, advanced beginner, proficient, or expert? Why?

- Renata reviews her résumé and the job post, preparing herself to discuss her relevant academic achievements. When the interviewer asks Renata why she is most interested in working with them, Renata refers to her résumé and reiterates why she feels she should be hired.
- Tony spends an hour or so reading through the company website, and because he knows the importance of experience, he asks his roommates and close friends about their recent experiences with interviewing. His friends suggest that he be prepared to demonstrate knowledge of the company's mission and values. When the interviewer asks Tony why he is most interested in working with them, he summarizes the ideas he remembers from the company's website.
- Xavier reviews his résumé and the job post, as well as the company website. He also reads online reviews from both employees and customers because he knows the value of digging deeper and finding primary sources. When the interviewer asks Xavier why he is most interested in working with them, he responds with a few key facts from the website and mentions that he has read positive reviews about the company's low employee turnover and great potential for growth.
- Raven extensively reviews the company website for information that she can align with her own résumé. She also investigates the company's social media presence and reads online reviews from both employees and customers. Raven feels prepared with primary source material and personnel insight. When the interviewer asks Raven why she is most interested in working with them, she highlights the company's key achievements that are most closely related to her own accomplishments. She also mentions that she hopes to contribute to some of their corporate outreach efforts and offers insight on how to improve the corporate Instagram page.

- Aliyah compares the job post against her résumé and, like Raven, reviews the company website for relevant information that aligns with her strengths. She also explores the company’s social media presence and, further, looks for online articles about its success, outreach, and climate. Aliyah also uses campus resources to practice for her interview, and she solicits advice from faculty mentors and recent alumni with whom she has connected through her university’s career center. When the interviewer asks Aliyah why she is most interested in working with them, she highlights the company’s achievements in a way that enables her to reiterate her skill sets and interests. She also praises the company’s corporate outreach and policies, and cites positive reviews posted online by employees, customers, and relevant professional associations.
- How would you rate your own information literacy level? Why?
- What factors about your background and your experiences have facilitated your development into an information literate individual? What factors and experiences have hindered this development?
- What are some other examples of fake news that you’ve been seeing in the news lately? What is it that makes these stories fake news?
- Thinking about the information science career you’re planning to pursue, how do you think information literacy might prove relevant to your work?

**Learning Activity:** Reread Rachael’s, Ben’s, Ricardo’s, Erin’s, and Fatima’s stories at the beginning of this chapter. For each of these individuals (1) identify the specific way(s) in which their information literacy was limited (as applicable); (2) describe the impacts that these limitations likely had on their outcomes; and (3) envision one or two ways in which an information professional might have been able to intervene (whether directly or indirectly) and thereby help the individual to reach a better health outcome.

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# 6

## *Digital Divide and Digital Inclusion*

*Mr. Joseph recently graduated from college with a joint major in education and history. He is excited to start teaching at a large public high school in Metropolis, where the student body is very diverse. As a typical “post-Millennial,” he plans to use online multimedia resources (in addition to textbooks), post all of his classroom materials on a shared online space, and require students (as well as their parents) to sign up for an app that will send reminder texts about upcoming assignments. At orientation, he mentions his plans to his new department head, Ms. Dillon, who looks at him with a bit of skepticism and then asks, “How much do you know about the students at this school? I mean, over half of our student body qualifies for free lunch and many of them speak a language other than English at home.” Mr. Joseph nods slowly but doesn’t quite understand what his supervisor is suggesting. After all, his students are teenagers – they are “digital natives,” who have grown up with technology. What could be the problem with what he plans to do?*

\* \* \*

You may recall that, in [Chapter 2](#), we introduced the concept of information access. We also talked about the concept of “information overload,” a phenomenon in which someone has access to too much information. In this chapter, we introduce the idea that sometimes the opposite phenomenon – lack of access to information – is the problem. More specifically, we will explore a specific barrier to information access (the digital divide) and the efforts currently underway to overcome this barrier (digital inclusion). While reading this chapter, recall what you just learned about digital literacy in [Chapter 5](#), a concept that is integral to breaking down the digital divide and promoting digital inclusion. “If the digital divide and digital illiteracy are the problem, digital inclusion is the proposed solution, representing the ability of individuals and groups to access and use information and communication technologies” (Jaeger, Bertot, Thompson, Katz, & DeCoster, 2012, 6).

Perhaps you’re wondering why this discussion is relevant to you as a future [insert dream job again!]. The purpose of this discussion is to make you, as someone who will work with users of information in some capacity or another, now or in the future, more aware of the challenges that some users may face when it comes to accessing information. The assumptions you make about your users may very well influence the systems or applications you design for them or even the ways in which you interact with them. It is important for you to not only acknowledge the differences among your users but also to think about what you can do to promote equitable access to information among them.

## BRIEF HISTORY OF THE DIGITAL DIVIDE

Depending upon your age, this next statement may be a little surprising to you: There was a time when many people did not know what the Internet was, much less use it in their daily lives! The birth of the Internet is generally traced back to the 1960s when the

Department of Defense began developing the networks that laid the foundations for today's information and communication (ICT) technologies. Yet, the average person did not know of its existence until almost thirty years later: "Since the Internet was initially funded by the government, it was originally limited to research, education, and government uses. Commercial uses were prohibited unless they directly served the goals of research and education. This policy continued until the early 90's, when independent commercial networks began to grow." (Howe, 2016, n.p.). And, along with the growth of ICTs came the understanding that not everyone would benefit equally from these technological developments. The concept of the "digital divide" quickly emerged, as people began to think about how unequal access to ICTs would impact society. Although a single, widely accepted definition of the digital divide has never emerged, underlying the various definitions is a common theme. Compare, for example, the following definitions:

- "the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access [ICTs] and to their use of the Internet for a wide variety of activities" (Organisation for Economic Co-operation and Development (OECD), 2001, 4)
- "the economic, educational, and social inequalities between those who have computers and online access and those who do not" (Merriam-Webster Dictionary, n.d.)

In other words, the digital divide – at its core – is about the "haves" and "have nots." But, what exactly do people on the "wrong side" lack? Initially, the focus was on whether people had the necessary hardware and/or software, as well as the means to access the Internet. As we approached the twenty-first century, an increasing number of people owned desktop and laptop computers and were connecting these computers to the World Wide Web. In 2000, Pew Research Center began its study of the social impact of technology. At that time, 48 percent of adults living in the United States did not use the Internet. Between 2000 and 2015, the percentage of

American adults using the Internet increased to 84 percent (Perrin & Duggan, 2015). During this time period, the existence of varying levels of Internet access among different groups became quite evident: “For some groups, especially younger adults, those with high levels of education and those in more affluent households, internet is at full penetration. For other groups, such as older adults, those with less educational attainment, and those living in lower-income households, adoption has historically been lower but rising steadily ... [but] digital gaps exist.” (p. 2)

## THE DIGITAL DIVIDE TODAY

Fast forward to 2019: There is an assumption that nearly *everyone* in the United States has access to the Internet. But, is this assumption correct? Recent data can help us get a clearer picture of the current landscape (Pew Research Center, 2019):

- In the United States, 10 percent of adults do not use the Internet. This figure has remained relatively constant over the past few years.
- The top reasons for non-Internet use are lack of interest, a belief that it is too difficult to use, and the cost of owning a computer and/or Internet service.

These data points demonstrate that everyone is *not*, in fact, online, and additional data from Pew and other sources reveal that certain communities are more likely to have a higher proportion of non-Internet users than others. Those with the following characteristics are more likely to find themselves on the wrong side of the digital divide.

- *Lower socio-economic status:* 18 percent of adults from households earning less than \$30,000/year are not Internet users. Their relative lack of disposable income is likely a contributing factor.

- *Lower educational attainment level*: 29 percent of adults with less than a high school education do not use the Internet. More time in a formal education setting provides more opportunity to use the Internet, even for those individuals who do not have Internet access at home.
- *Non-native English speaker*: 52.9 percent of websites use the English language (Charlton, 2018). By way of comparison, Chinese is the world's most spoken language and there are 772 million Chinese Internet users, yet less than 2 percent of the top 10 million websites are written in Chinese. As a practical matter then, “[f]or those who cannot speak or understand English, much of the internet is out of reach.”
- *Older age*: 27 percent of older adults (i.e., ages 65 and older) do not use the Internet. Individuals within this age group grew up and worked in a pre-Internet era and so they are more likely to feel as if it's not necessary for them to go online or that it's too difficult for them to learn how to do so now.
- *Disabled*: 23 percent of individuals with disabilities do not use the Internet. This is due, at least in part, to the inaccessibility of many websites and applications.
- *Live in a rural area*: 15 percent of rural Americans do not use the Internet. As described in more detail later, rural areas may not have access to broadband, which negatively impacts the quality of access.

One thing to note is that these barriers to Internet access are not mutually exclusive; in fact, they often layer upon one another, creating multiple roadblocks for certain users. For example, individuals with a disability are more likely to be older and to make less money than other groups (Bialik, 2017). As such, an individual with a disability may not use the Internet because of accessibility issues or cost or the simple fact that they fail to see how it is relevant to their lives (perhaps due to inaccessibility).

Furthermore, the situation in 2021 is also complicated by the fact that, now more than ever, all Internet access is not created equal.

There are two aspects of the digital divide, in particular, that are currently receiving a fair amount of attention. The first has to do with the presence or absence of broadband access, and the second has to do with the type of device or devices that you have at your disposal to access the Internet.

Broadband is high-speed Internet access, currently defined by the Federal Communications Commission (FCC) as a minimum download speed of 25Mbps and a minimum upload speed of 3Mbps. Certain parts of the country still lack the infrastructure necessary for broadband access, and the development of such infrastructure has been particularly slow in rural communities. In 2016, Brookings Institute reported that 39 percent of rural areas lack broadband access, as compared to only 4 percent of urban areas (West & Karsten, 2016). In addition to those who could not get broadband access no matter how much they wanted it, not everyone living in communities where broadband infrastructure exists chooses to adopt it. Federal government data from 2015 show that broadband adoption across the United States varies widely, ranging from 63 percent in Mississippi to 82 percent in Wisconsin (National Telecommunications and Information Administration (NTIA), n.d.).

Geography is not the only factor contributing to uneven broadband adoption though, with individuals living in households with income under \$20,000, older adults, and individuals with less than a high school education being significantly less likely to have a broadband subscription as compared to wealthier, younger, and/or more educated individuals (Tomer & Kane, 2015). For example, according to a recent Pew Research Center report, 56 percent of individuals living in a household that earns less than \$30,000 have home broadband, as compared to 94 percent of individuals living in a household that earns more than \$100,000 (Anderson, 2019). The reasons for broadband nonuse mirror these reasons in connection with the nonuse of the Internet in general: lack of interest, high cost, and perceived difficulty of use.

If you have any experience with using a dial-up modem, then you likely have an inkling why individuals who lack broadband access are at a distinct disadvantage. The quality of the online experience,

particularly if you are attempting to download large files or access multimedia resources (e.g., YouTube videos), is inferior. And, though having difficulty watching YouTube videos is more of an inconvenience than anything else, there are more serious implications. For example, according to the NTIA (n.d.), “80 percent of Fortune 500 companies require online job applications.” Slower Internet speeds can make it challenging to navigate through the different parts of an online system and upload documents (such as a résumé or cover letter) – perhaps even discouraging a user from seeing the process through to the end. Other online transactions, such as banking and government services, are similarly challenging (not to mention frustrating!) when your Internet service is lagging. Lack of broadband access can take activities that are meant to be easier and more convenient to conduct online and turn them into the exact opposite.

The other facet of the digital divide garnering more attention in recent years focuses on the type of device that a person uses to gain access to the Internet. In the 1990s, it was simpler because the majority of people only had desktop computers, and laptop computers were – more or less – used for specific purposes, often in connection with employment. By 2005, however, the sale of laptops exceeded those of desktop computers (Arthur, 2009). That was just the beginning, however, and one only has to look at people sitting on a bus or train to get an idea of how many mobile devices are out there now – the Palm Pilots of the turn of the century have been replaced by mobile phones (and now smartphones), tablets, and e-readers. Some individuals have a variety of devices and can select the device that works best for a specific type of transaction or activity. For example, they use their smartphone for accessing social media sites, their tablet for watching a movie while on an airplane, their laptop for answering emails, and their desktop for editing photographs. Not all individuals have this luxury, however. Lower-income Americans, for example, are more likely to rely on their smartphones to access the Internet. Consider the following statistics about adults living in a household that earns less than \$30,000 (Anderson & Madhumitha, 2019):

- 54 percent own a desktop or laptop computer (as compared to 94 percent of individuals living in a household that earns more than \$100,000); and,
- 26 percent own a smartphone but do not have broadband access at home. This particular group is characterized as being “smartphone dependent.”

This second statistic also highlights the extent to which different facets of the digital divide – broadband access and type of device – also intersect. That is, individuals without broadband access may find themselves more dependent upon a specific device (i.e., a smartphone). And, although a smartphone provides fast and convenient Internet access, it may not always be the best device for a specific task. Think again about online job applications: The size of a smartphone screen can make it difficult to fill out a text-heavy form, and uploading documents is more complicated when you cannot toggle easily between different applications.

Let’s turn our attention back to the scenario provided at the beginning of this chapter. All of Mr. Joseph’s students are not likely to have the same kind of access. Given what Ms. Dillon said about many students qualifying for free lunch, it is likely that at least some of these students are “smartphone dependent.” Students trying to view online resources on a smartphone may have a more difficult time than students who have a laptop or desktop computer, particularly if the resource is not compatible with mobile devices. Furthermore, students who are smartphone dependent will have to use cellular data to do their homework; depending on whether or not the student has a cellular plan with unlimited data, this could present a financial challenge to a family who is already struggling.

So far in this chapter, we have focused on the way in which the digital divide impacts individuals. It’s also important, however, to think about the broader, societal impacts of the digital divide. Although these conversations may seem somewhat new, the US government actually began laying the foundation for them almost half a century before the birth of the Internet! With the Communications Act of 1934, Congress developed unifying telecommunications and broadcasting

standards to promote widely available wire and radio communication services across the United States in an affordable manner. Although this law did not offer subsidies or other forms of support to low-income individuals, it did establish the precedent that telecommunications should be provided in an inclusive manner.

The first significant update to the Communications Act of 1934 did not materialize until more than 60 years later. The Telecommunications Act of 1996 promoted universal service to people in low-income, rural, high-cost, and other disadvantaged situations with the goal of providing these communities with affordable service. If you've been paying attention while reading this book, you know that the mid-1990s was the point at which concerns about the digital divide first began to emerge. This act, through the creation of the Universal Service Fund, provided schools, libraries, and rural health-care providers with financial assistance through the E-rate program. It is through E-rate program discounts that these institutions have been able to obtain affordable Internet and other telecommunications services.

Twenty years later, in the wake of the global recession, Congress passed the American Reinvestment and Recovery Act. As part of this act, almost \$5 billion was to be used to build broadband infrastructure specifically in underserved and unserved areas, with a portion of that money earmarked for rural areas. In addition to building the necessary infrastructure, the administration of Barack Obama was committed to developing a robust broadband policy, as evidenced by the publication of the National Broadband Plan by the National Telecommunications and Information Administration (NTIA) in 2009.

It is important to note, however, that public policies can and do evolve. In recent years, you may have read and or heard news stories about "net neutrality," which has been defined as "the concept of online non-discrimination. It is the principle that consumers/citizens should be free to get access to – or to provide – the Internet content and services they wish, and that consumer access should not be regulated based on the nature or source of that content or service." (ALA, 2014, n.p.). In other words, Internet service providers (ISPs) cannot create "fast lanes" that benefit certain content providers. Now,

you may be wondering how any of this affects you, as a consumer – not provider – of online services. Net neutrality regulations prohibit “[a]n ISP . . . from slowing the delivery of a TV show simply because it’s streamed by a video company that competes with a subsidiary of the ISP” (Snyder, Yu, & Brown, 2017). Comcast, for example, has a lot of subsidiaries – in an attempt to favor one of the streaming services it owns, it could conceivably slow down Netflix or Hulu.

In the United States, the Federal Communications Commission (the FCC) is often at the center of the debate, as it is the government agency that determines how Internet services are classified. This classification matters because, if under the Communications Act of 1934, ISPs are classified as a “common carrier service,” the FCC can regulate the services and prevent online discrimination. If, however, Internet services are classified as “information services,” the FCC takes a more “hands off” approach, which creates the opportunity for commercial entities to provide different levels and quality of service to different customers. As the FCC is comprised of political appointees, its position toward net neutrality is very much influenced by the stance of the US president. During the Obama administration, the FCC was generally in favor of net neutrality, whereas the administration of Donald J. Trump tended to favor the interests of private entities. Ajit Pai, the chairman of the FCC during the Trump administration, when rolling back net neutrality, characterized the Obama administration’s approach as “government overreach” that will negatively impact investment and innovation (Snyder, Yu, & Brown, 2017).

This ongoing debate has led to a number of court challenges, and the US Congress has tried (unsuccessfully, to date) to pass legislation in support of net neutrality. In addition, an increasing number of state legislatures have taken matters into their own hands, seeking to pass laws that codify net neutrality within their states. California has been the first state to successfully do so, and the US government, unsurprisingly, launched a legal challenge to this new law.

You may also be wondering how net neutrality fits into this chapter’s discussion about the digital divide. Earlier, we discussed

how a disproportionately large percentage of Americans living in rural areas lack access to quality broadband services. Without the protection of net neutrality, these communities could face graver challenges if ISPs choose to slow down certain content and services, thereby further decreasing their access to information.

On a more positive note, this type of focus on the impact of the loss of net neutrality on communities has paved the way for a more proactive approach to dealing with the digital divide. Rather than framing the issue as one of “haves” versus “have nots,” current discussions tend to focus on how we can address the problem of inequitable access to ICTs. Having discussed the various ways in which the digital divide continues to impact individuals as well as society as a whole, we will now turn our attention to something more positive – current efforts underway to create a more digitally inclusive society. Whereas discussion around the digital divide tends to focus on the access available to individuals, digital inclusion is meant to signal a focus on a practical, policy-driven approach that addresses the needs of communities as a whole. In short, digital inclusion is a framework for assessing and considering the readiness of communities to provide access to opportunities in a digital age. The National Digital Inclusion Alliance (NDIA) offers the following definition: “Digital Inclusion refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of [ICTs]. This includes 5 elements: (1) affordable, robust broadband internet service; (2) Internet-enabled devices that meet the needs of the user; (3) access to digital literacy training; (4) quality technical support; and (5) applications and online content designed to enable and encourage self-sufficiency, participation and collaboration.”

A 2015 Benton Foundation report presented findings from a national study of eight digital inclusion organizations across the United States, all of which are working to make high-speed Internet access available in low-income communities, to provide digital literacy training to the individuals who live and work in these communities, and to assist low-income individuals and families with adopting high-speed Internet service (Rhinesmith, 2015). The four specific activities

highlighted in the report – provision of low-cost broadband, digital literacy training based on relevant content and services, availability of low-cost computers, and opening of public access computing centers – not only closely align with the elements specified in the definition of “digital inclusion” provided earlier but also directly address the barriers to information access discussed earlier in this chapter. For example, think about Mr. Joseph’s students who receive free lunch. This means that their household income is under the poverty line, and so the cost of computers and Internet access is a burden for the families of these students. Digital inclusion initiatives that not only provide affordable Internet access but also refurbish old computers and make them available to low-income families are enormously helpful to the families of Mr. Joseph’s students. Moreover, the parents of some of these students may not speak English as a first language. Based on Pew Research Center data, we know that they are then less likely to use the Internet. Digital inclusion initiatives that set up public computer centers where members of the public can take digital literacy training in different languages would be enormously helpful to these families as well.

Across the country, a number of towns and cities have developed digital inclusion initiatives, in which various stakeholders (both public and private) come together to provide some combination of the four activities listed in the Benton Foundation report. For example:

- The City of Philadelphia has created the Digital Literacy Alliance, which provides financial support to organizations within the city that work to promote digital inclusion (City of Philadelphia Office of the Mayor, 2018). Recent grant recipients include the following: Furness High School (reinforces language skills for English-Language-Learning students by teaching them to code in support of environmental conservation), Key Elementary School (collects and digitizes stories about immigrant communities with a focus on preservation and education), Overbrook Educational Center (implements BrailleNote Touch devices to reduce the digital divide for visually impaired students), and Supportive

Older Women's Network (offers digital literacy workshops for grandparents who are raising their grandchildren).

- In Little Rock, Arkansas, the public housing agency partnered with both public- and private-sector entities (including Central Arkansas Library and Best Buy) to provide digital literacy training to public housing residents as part of the Department of Health and Human Services' ConnectHome USA initiative.
- The Digital Upcycling program, a collaborative effort launched in Kansas City, Missouri, provides recycled computers to low-income residents (including public housing residents) and community learning centers. As part of this initiative, two local nonprofit organizations have been training and hiring "Digital Scholars" to provide refurbishing services, as well as digital literacy training.
- Several school districts (including Caldwell County in North Carolina and Coachella Valley Unified School District in California) have turned their buses into "rolling study halls" by equipping their school buses with Wi-Fi (Forsman, 2019).
- In Fairfax County, Virginia, K-12 students can borrow a mobile hotspot from their school libraries (Luftglass & Tate, 2018).

In addition to local government agencies, nonprofit and private entities have also spearheaded digital inclusion initiatives. Examples include:

- In 2014, Google launched the Digital Inclusion fellowship, in collaboration with the Nonprofit Technology Network. The purpose of this program is to support the efforts of sixteen individuals to work with community organizations to build digital inclusion programs "from the ground up" in eight metro areas across the United States. In the first year of this initiative, one fellow worked with the Triangle Literacy Council (in the Raleigh-Durham metro area) to create a mobile computer lab that would travel to libraries, community centers, jails, and schools to provide basic digital literacy training.
- In March 2019, Sprint began providing military veterans with high-speed wireless access to the Department of Veteran

Affairs' telehealth application at no charge.

- With funding from the Institute of Museum and Library Services (IMLS), the Public Library Association created [DigitalLearn.org](#), an online hub for digital literacy support and training. The site provides self-directed tutorials on basic skills (e.g., setting up an email account) as well as more advanced skills (e.g., applying for jobs online).

A word of caution: Refrain from thinking about digital inclusion as the final solution to the digital divide. Neither the digital divide nor digital inclusion is static. As long as there are new technologies to be developed and new devices to own, at least some facets of the digital divide will persist because not everyone will have access to the "latest and greatest." For this reason, it's important to acknowledge the extent to which the digital divide coexists with ongoing efforts to create a digitally inclusive society. Doing so keeps us from being complacent and ensures that information professionals remain committed to taking actions that address the digital divide in whatever form it takes. Don't forget that you can use your education and your expertise to contribute to digital inclusion!

## DISCUSSION QUESTIONS

- Thinking back to the scenario at the beginning of the chapter, what can Mr. Joseph do to help his students who may be on the wrong side of the digital divide?
- Do you think that full digital inclusion is possible? Why or why not?
- Is it the government's responsibility to create solutions/remedies to address the digital divide? Why or why not?
- Thinking about the career you wish to pursue, how might the digital divide prove relevant to your work? How might you help to promote digital inclusion?

**Learning Activity:** Put your information literacy skills to the test and find the most recent statistics you can about Internet use. Are there changes from the figures provided in this chapter? Does this surprise you? Why or why not?

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# 7

## *Finding, Reading, and Critiquing Information Behavior Studies*

*Professor Flores wanted to know whether cancer patients read the many personal stories that other cancer patients share on social media sites such as Facebook and YouTube and, if so, why do they do so. She recruited cancer patients for her study by placing flyers in the waiting room of a local cancer clinic, with permission of the clinic's director. Thirty cancer patients saw the flyer and called Professor Flores, volunteering to be interviewed for the study. Professor Flores met with each interviewee separately, in a location of their choosing. At the beginning of each session, she asked each interviewee to sign an informed consent form, indicating that they were at least eighteen years old, that they had read and understood the consent form, that Dr. Flores had answered any questions they might have had, that they were voluntarily agreeing to participate in the study, and that the researcher had their permission to audio-record their interview session. Drawing on her interview protocol (that is, a list of preprepared questions used to guide the interview*

*process), Professor Flores then asked each participant a series of ten questions, probing (asking follow-up questions) as needed in order to get any additional information that might be of interest. After completing all thirty interviews, Professor Flores had the audio-recordings of each interview transcribed (a process in which the content of the audio-recording is typed out into a written format) and then analyzed the entire set of transcripts to find any overarching themes that appeared across a significant subset of the interviews. Some of the themes she identified included “feeling not so alone” and “picking up tips to improve my physical health.” After she completed her analysis of the data, Professor Flores wrote a paper to share her results and submitted it for publication in a journal called “Information Behavior Research.” Upon receiving her paper, the editor of the journal reviewed it before sending it out to three “peer reviewers” (that is, other researchers who are actively engaged in related information behavior research), who were asked to evaluate the paper and recommend whether the journal should accept or reject the paper. Two months later, the journal editor let Professor Flores know that her paper had been accepted and that she would just need to make some specific minor edits, according to the recommendations of her peer reviewers. Professor Flores’ final paper ultimately appeared in the June issue of “Information Behavior Research.”*

\* \* \*

Information behavior researchers frequently conduct investigations into people’s information behavior using methods such as interviews and surveys, and then communicate their findings through scholarly venues such as conferences and journals. In this chapter, we first provide a general introduction to the overarching system of scholarly communication and then provide specific guidance on finding, reading, and critiquing information behavior studies. We then wrap up the chapter with a sample report of an information behavior study,

annotated to identify the various sections, the required components of each of these sections, and tips for evaluating the quality of each section and of the overall study/report.

## THE SCHOLARLY COMMUNICATION SYSTEM

In this section, we provide a general overview of the scholarly communication system, as the processes through which information behavior researchers share their work and are embedded in and influenced by this system. For more than 350 years, scholars have communicated their work through scholarly journals. Many of the publishers of these journals hire one or more editors who oversee a peer review process through which papers submitted to the journal are considered for publication by the authors' peers. These "peers" are usually researchers who are actively engaged in conducting research and publishing their own work in the same or closely aligned disciplines.

In general, peer reviewers are asked to carefully review the submission and answer a number of questions, such as:

- Whether the research addresses a significant problem (e.g., is it important to know whether and why cancer patients are reading the personal accounts of other cancer patients in social media venues?);
- Whether the author has effectively summarized related past work in their review of the literature;
- Whether the author has used an appropriate research method (e.g., was it appropriate for Dr. Flores to use interviews to find out whether and why cancer patients read the personal accounts that other cancer patients had shared through social media?);
- Whether the author conducted their research ethically (e.g., did the author have approval to conduct the research from their Institutional Review Board (IRB)?); did the author obtain informed consent from research participants? (Ethical considerations in research are discussed in further detail in [Chapter 8](#);

- Whether any conclusions the author drew were consistent with the findings from their study;
- Whether the paper makes an important contribution to the existing body of literature in the field; and
- Whether the paper is interesting and well written.

Peer reviewers are also tasked with answering one central question: Should this work be published in this particular journal? This is frequently posed as a multiple-choice question, with reviewers being able to select from several options, such as (1) Publish as is, (2) Publish with minor changes, (3) Publish with major changes required, (4) Invite the author to revise and resubmit for reconsideration by the journal, or (5) Reject. Although the first three of these choices signal to a publisher that the work is at least potentially worth including in their journal, the last two express grave doubts. Submitting a decision of “revise and resubmit” calls for the author to engage in extensive rewriting and then resubmit the revised paper to the journal for further consideration. The last option, “reject,” expresses the opinion that the paper should not be published in this particular journal. At times, this may be due to the fit of the paper with the journal scope and aims (e.g., *Information Behavior Research Journal* would not consider publishing a study about the discovery of a new animal species in the Canary Islands; this would be way out of scope!). Many times, however, this has to do with peer reviewers’ perceptions regarding the quality of the paper and/or of the research study itself. Though the names of the author(s) of a submission may or may not be shared with a peer reviewer, it is customary that peer reviewers remain anonymous to the authors of the paper. There are some exceptions to the latter rule – for example, the *Journal of Medical Internet Research* (JMIR) (<https://www.jmir.org>) publishes the names of the peer reviewers at the bottom of each article (e.g., <https://www.jmir.org/2016/10/e269>).

Information behavior researchers share their work not only by publishing in scholarly journals, but also by speaking at academic and professional conferences. In addition, many researchers share their work by making their papers and presentations available through their

own personal home pages online and/or through institutional or discipline-based repositories. Regarding institutional repositories, authors employed by a particular institution (such as your specific university or college) are frequently encouraged to share their work with the public by depositing their work into their institution's repository. For example, the University of Maryland's institutional repository is DRUM (Digital Repository at the University of Maryland; <https://drum.lib.umd.edu>). Authors may also choose to share their work with the public by placing it in a discipline-based repository. For example, researchers working within the Library and Information Science (LIS) field commonly deposit their work in the e-LiS (E-Prints in Library & Information Science; <http://eprints.rclis.org>) repository and/or the DLIST (Digital Library of Information Science and Technology; <https://repository.arizona.edu/handle/10150/105067>) repository.

As described in the preceding paragraphs, information behavior researchers have a number of options when it comes to venues for sharing their work. In the next section, we will discuss strategies for efficiently and effectively finding journal articles and conference presentations that focus on information behavior investigations.

## FINDING INFORMATION BEHAVIOR STUDIES

Articles reporting the results of information behavior studies appear in a number of different journals. [Table 7.1](#) shows some of the most well-known journals that regularly feature reports of information behavior research. Although these journals all fall squarely within the field of LIS, it is important to note that information behavior research regularly appears in the journals of other disciplines as well. For example, marketing journals frequently include articles that describe studies investigating the information behavior of shoppers/consumers. Similarly, health-related journals frequently include articles that describe studies investigating the information behaviors of doctors, nurses, and/or patients. However, when you're searching for information behavior studies, be sure to keep in mind that authors do not always use the phrase "information behavior." They frequently use

more common, related phrases, such as “information needs” or “information seeking.” Additionally, they may use the variant spelling “information behaviour.” Keep in mind that you will need to be creative in order to come up with search queries that will effectively retrieve information behavior studies that do not contain the exact phrase “information behavior.” The search terms “problem solving” and “decision making,” for example, may yield relevant results for you.

**Table 7.1. Journals that Regularly Include the Work of Information Behavior Researchers**

Journal	Scope
<i>Information Research: An International Electronic Journal</i> ( <a href="http://www.informationr.net/ir">www.informationr.net/ir</a> )	“Information Research publishes refereed papers in the fields of information science, information management, information systems, information policy, archives and records management and librarianship. We are interested in papers that deal with these topics either in general, or with reference to a particular application area. For example, papers on health information management and information seeking in a health context, or on the relationship between media and information seeking or information management, or papers on the relationship between information behaviour and computer use.”
<i>Library &amp; Information Science Research</i> (LISR)	“Library & Information

<p><a href="https://www.journals.elsevier.com/library-and-information-science-research">(https://www.journals.elsevier.com/library-and-information-science-research)</a></p>	<p>Science Research, a cross-disciplinary and refereed journal, focuses on the research process in library and information science as well as research findings and, where applicable, their practical applications and significance.”</p>
<p><i>Journal of Documentation</i> (JDoc)  <a href="http://www.emeraldgroupublishing.com/products/journals/journals.htm?id=jd">(www.emeraldgroupublishing.com/products/journals/journals.htm?id=jd)</a></p>	<p>“The Journal of Documentation (JDoc) is one of the longest-established academic journals in library/information science, providing a unique focus on theories, concepts, models, frameworks and philosophies related to documents and recorded knowledge... JDoc provides a link between research, scholarship and reflective professional practice. It publishes research papers with novel methods or results of wide significance, in all the information-related disciplines.”</p>
<p><i>Journal of Information Science</i> (JIS)  <a href="https://journals.sagepub.com/home/jis">(https://journals.sagepub.com/home/jis)</a></p>	<p>“The Journal of Information Science is a peer-reviewed international journal of high repute covering topics of interest to all those researching and working in the sciences of information and knowledge management. The Editors welcome material on any aspect of information</p>

	science theory, policy, application or practice that will advance thinking in the field.”
<i>Library Trends</i> (LT) ( <a href="https://www.press.jhu.edu/journals/library-trends">https://www.press.jhu.edu/journals/library-trends</a> )	“Library Trends is an essential tool for professional librarians and educators alike. Every issue explores critical trends in professional librarianship, and includes practical applications, thorough analyses, and literature reviews. Each issue brings readers in-depth, thoughtful articles, all exploring a specific topic of professional interest. Every year, Library Trends covers a wide variety of themes, from special libraries to emerging technologies.”
<i>Journal of the American Society for Information Science and Technology</i> (JASIST) ( <a href="https://onlinelibrary.wiley.com/journal/15322890">https://onlinelibrary.wiley.com/journal/15322890</a> )	“The Journal of the Association for Information Science and Technology (JASIST) is a leading international forum for peer-reviewed research in information science. For more than half a century, JASIST has provided intellectual leadership by publishing original research that focuses on the production, discovery, recording, storage, representation, retrieval, presentation, manipulation, dissemination, use, and evaluation of information and on the

	tools and techniques associated with these processes.”
<i>Information Processing &amp; Management (IP&amp;M)</i> ( <a href="https://www.journals.elsevier.com/information-processing-and-management">https://www.journals.elsevier.com/information-processing-and-management</a> )	“Information Processing and Management is a leading international journal focusing on publishing peer-reviewed original research concerning theory, methods, or application in the field of information science, including ... research in human information behavior and related areas that deal with the nature, manifestations, behavior, and effects of information or knowledge, along with the communication and distribution of that information or knowledge. ... The journal’s aim is to serve the interests of researchers and practitioners in furthering knowledge in the broad area of information science and related fields by providing an effective forum for the timely dissemination of advanced and topical issues.”
<i>Library Hi Tech</i> ( <a href="http://www.emeraldgroupublishing.com/products/journals/journals.htm?id=lht">www.emeraldgroupublishing.com/products/journals/journals.htm?id=lht</a> )	“Library Hi Tech (LHT) is concerned with technology-assisted information systems that support libraries & cultural memory, education & the academy, health & medicine, and government & citizenship. LHT

covers the IT-enabled creation, curation, representation, communication, storage, retrieval, analysis, and use of records, documents, files, data, and learning objects. It publishes digital information and knowledge research that applies a broad array of approaches and epistemologies, including any mix of qualitative, quantitative, mixed-methods, action, participatory, evaluation, design, development, or other methods, in areas such as Information platforms, interfaces, and applications; Human–computer interaction; Information experience; Human information processing; Human information behaviour; Information analysis; Information governance and security; System quality and reliability; and Internet of Things & devices.”

*The Library Quarterly* (LQ)  
(<https://www.journals.uchicago.edu/toc/lq/current>)

“As a leading interdisciplinary journal of library research, *The Library Quarterly* embraces a wide array of original research perspectives, approaches, and quantitative, qualitative, evaluation,

analysis, and mixed methods to assess the role of libraries of all types in communities and in society. Through unique and innovative content that positions libraries at the nexus of information, community, and policy, LQ publishes cutting-edge articles, essays, editorials, and reviews that ... enable by investigating the interactions between cultural spaces and users of information; study the impact of information and communication technologies on libraries and their communities; and examining users and information behavior. Across these areas, all content in the journal ties to contemporary issues impacting libraries and librarianship. Through such research, the overarching goal of Library Quarterly is to engage researchers, educators, professionals, and students interested in the roles of the libraries in the lives of individuals, communities, and nations.”

*International Journal of Information, Diversity, & Inclusion (IJIDI)*  
(<https://jps.library.utoronto.ca/index.php/ijidi>)

“The International Journal of Information, Diversity, & Inclusion (IJIDI) presents wide-ranging and

	<p>multidisciplinary perspectives on the intersection of equity, social justice, and information. The journal seeks to expand the discourse on how access to, interaction with, and the use of information by a range of populations can impact individuals, communities, and society. IJDI is a quarterly, open access, online journal.”</p>
<p><i>First Monday</i> (<a href="https://firstmonday.org/ojs/index.php/fm/index">https://firstmonday.org/ojs/index.php/fm/index</a>)</p>	<p>“First Monday is one of the first openly accessible, peer-reviewed journals solely devoted to research about the Internet. First Monday has published 1,821 papers in 272 issues, written by 2,537 different authors, over the past 22 years. No subscription fees, no submission fees, no advertisements, no fundraisers, no walls.”</p>

To find relevant articles in each of these journals, you could simply visit each journal’s home page and conduct a query. However, this method will not be an efficient way of finding *all* articles that are relevant to your area of interest. For example, if you’re trying to find as many articles as possible that focus on the information behavior of doctors, it would not be efficient (nor comprehensive) to conduct a search on each journal’s home page. Instead, you will want to conduct cross-journal searches using Google Scholar (<http://scholar.google.com>) and/or your college’s or university’s library databases.

The most relevant and fruitful library databases for finding information behavior research include Library & Information Science Source; Library and Information Science Abstracts (LISA); Library, Information Science and Technology Abstracts (LISTA); Library Literature and Information Science; ACM (Association for Computing Machinery) Digital Library; and Computer and Information Systems Abstracts (CSA). Some more general databases that frequently include information behavior research are WorldCat, ERIC (Education Resources Information Center), PsycINFO, EBSCO's Academic Search Ultimate, and the Web of Science. Another online database that includes very relevant information in the form of short encyclopedia entries is the Encyclopedia of Library and Information Science (ELIS).

If your library does not subscribe to relevant databases or if you are having difficulty finding a particular article, you can try DLIST (<http://arizona.openrepository.com/arizona/handle/10150/105067>) or E-LIS (<http://eprints.rclis.org>), both of which were described earlier in this chapter. You could also try the DBLP (which unofficially stands for "Digital Bibliography & Library Project") Computer Science Bibliography (<http://dblp.uni-trier.de/db>). You can also try OAISTER (<https://oaister.worldcat.org>), which enables you to simultaneously search many different repositories that house open-access (available for free online, without any subscription required) resources.

Many information behavior researchers share their work not only through published articles, but also through presentations at academic and professional conferences held around the world. The following LIS conferences commonly feature the work of information behavior researchers:

1. Association for Information Science & Technology (ASIS&T) Annual Meeting (<https://www.asist.org/am20>);
2. iConference (<https://ischools.org/the-iconference/about-the-iconference>);
3. Information Seeking in Context: The Information Behaviour Conference (ISIC) ([www.isic2020.co.za](http://www.isic2020.co.za));

4. ACM (Association for Computing Machinery) CHI (Computer–Human Interaction) Conference on Human Factors in Computing Systems (<https://sigchi.org/conferences/conference-history/chi>) (This conference is frequently referred to simply as “CHI”);
5. ACM Special Interest Group on Information Retrieval (SIGIR) (<http://sigir.org>);
6. ACM Conference on Computer Supported Cooperative Work (CSCW) (<http://cscw.acm.org>);
7. American Library Association Annual Conference & Exhibition (<https://2020.alaannual.org>); and
8. Conference on Inclusion and Diversity in Library and Information Science (CIDLIS) (<https://cidlis.umd.edu>).

Many of these conferences publish official annual proceedings in which they include the full text of the papers that were presented at their last conference. Many LIS conference proceedings are indexed in (that is, scanned and made available to users through) the library database called “ACM Digital Library.” This database is very helpful, whether you’re trying to find an entire volume of conference proceedings for one particular conference or a specific conference paper.

## **READING INFORMATION BEHAVIOR STUDIES**

When you read a book purely for pleasure, such as a mystery, romance, or science fiction novel, how do you go about it? Do you read directly from beginning to end or do you skip around? Do you read more passively or more interactively, weighing what the author has written and silently posing questions to them?

Chances are that you read linearly and passively, as you’re likely looking to be entertained rather than to add to your store of knowledge. However, it is often more effective to read research reports much less linearly and much more critically. You do not have to begin at the beginning and end at the end. For example, you may move directly to one particular section of an article, particularly if your information need is quite specific. If you just want a quick overview of

the study, read the Abstract. If you would just like to know how the authors conducted their study, go right to the Methods section. If you want to see the authors' findings and the types of evidence they gathered, turn to the Results section. If you would like to read about the implications and potential significance of the authors' findings, read the Discussion and Conclusion sections. However, if you will be writing a paper about a particular article or including the article in a literature review you're writing, it is very important to read the entire article so you're sure that you don't miss any important information.

When you're reading an information behavior study, it is also important to read interactively and critically. Ask yourself questions as you go along. Do you believe what the author has written? Why or why not? Do the authors' findings match up with your own experiences? If not, what might have caused this discrepancy? Also, ask the author questions – in your mind or you can go ahead and actually contact them, if you wish! If you notice any unjustified assumptions, formulate questions that you might pose to the author if they were present there with you. As you read the article, carefully consider whether or not you buy the author's story. If so, what makes you believe them? If not, what is it that is causing you to question their methods, findings, and/or conclusions?

If you are reading a large number of research studies, it can be very helpful to use a citation manager to keep track of which articles you have read and to jot down some notes about each one. A citation manager (also known as bibliographic management software) is a piece of software that enables you to build your own database of citation information (such as author name(s), article title, journal title, journal volume and issue number, and page range) for all of the articles you've read for a particular project. Some examples of commonly used citation managers include Zotero (<https://www.zotero.org>), EndNote (<https://endnote.com>), Mendeley (<https://www.mendeley.com>), and RefWorks (<http://proquest.libguides.com/newrefworks/welcome>).

Citation managers are also extremely useful when it comes time to write a paper, because they can largely automate the process for correctly formatting your in-text citations and your reference list. In-

text citations are notations that tell readers which article you are referencing. For example, you might write “Smith (2014) found that cancer patients are avid readers of blogs written by other cancer patients” or “Cancer patients are avid readers of blogs written by other cancer patients (Smith, 2014).” A reference list (sometimes called a “bibliography” or “works cited” list) is a list of the works you have cited within your paper. The entries in this list need to be properly formatted. You may be familiar with one or more citation styles, such as Modern Language Association (MLA) or Chicago style. Within the LIS field, APA (American Psychological Association) style is commonly used. For more information on APA style, see the Purdue Online Writing Lab (OWL) APA Formatting and Style Guide ([https://owl.purdue.edu/owl/research\\_and\\_citation/apa\\_style/apa\\_for\\_matting\\_and\\_style\\_guide/general\\_format.html](https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_for_matting_and_style_guide/general_format.html)). Purdue OWL also offers guides to other citation styles, including the MLA (Modern Language Association), Chicago NB (Notes and Bibliography) style, and AMA (American Medical Association) – see [https://owl.purdue.edu/owl/research\\_and\\_citation/resources.html](https://owl.purdue.edu/owl/research_and_citation/resources.html).

Articles reporting information behavior studies nearly always follow a standard format. The usual sections of these papers, as well as the contents generally included in each of these sections, are shown in **Table 7.2**. Although there are some exceptions, these are generally the components of an information behavior study, and they tend to follow this order in terms of their appearance in the paper.

**Table 7.2. Typical Sections of a Scholarly Journal Article Covering an Information Behavior Study**

Section	Description
Title	A concise description of what an article is about
Authors (including their credentials and affiliations)	A list of all of the authors of an article, along with each author’s credentials (e.g., PhD in Information Science) and their affiliations (e.g., University of Maryland College of Information Studies), precedes the text of the paper. For most information behavior papers, authors will be listed in order of their contribution to the project, so the first author listed usually has made the largest contribution to the work. However, in some fields, authors are simply listed alphabetically by author last name, regardless of the relative distribution of the effort.

Abstract	In the abstract, the author provides a 1- to 2-paragraph overview of the paper that introduces the overall topic, the research problem and research questions (or hypotheses) investigated, the methods used to conduct the study, a brief summary of the author's findings, and a description of the implications of these findings.
Introduction	In this first section of the body of the paper, the author introduces their overall topic, summarizes what has already been done on the topic and what gaps remain, identifies the specific research problem and specific research questions (or hypotheses) that they investigated, explains why this research problem and these research questions are important to address, and lays out their goals and objectives for their research.
Literature Review	In the literature review, the author provides a synthesized review of what has already been done in this research area and then ends this section with the identification of a specific gap that they intend to address with their research. Note that some authors/journals incorporate the literature review into the introduction section, so there may be no separate literature review section.
Methods	In this section, the author describes their overarching research design and describes in detail the specific methods they used to recruit participants for their study, to collect data from them, and to analyze this data. They also provide a rationale for using these particular methods. It is also good practice to include information about how the researcher protected study participants, such as how they secured informed consent from them and how they safeguarded participants' privacy, in this section. (We will discuss research methods in much more detail in the next chapter.)
Findings (or Results)	This section frequently begins with a subsection in which the authors describe their participants (e.g., How many people participated? What were their ages, genders, or any other relevant demographic or other types of characteristics?), although this information may appear as the last subsection in the Methods section. The author then moves into their actual findings, identifying the answers to their research questions and/or the central themes that emerged in their data. Throughout this section, the author includes various forms of evidence to support their findings. Such evidence may include statistics, verbatim quotes from participants, etc.
Discussion	Once the author has shared their findings, they will move into this next section, providing a brief summary of their major findings, tying their findings back to prior literature (which of their findings support the findings reached by earlier researchers? which contradict prior findings?), and discussing what their results might mean. Authors will frequently outline the limitations of their study in this section, although you may occasionally see limitations described in the Methods or Conclusion sections.
Conclusion	In this final section of the body of the paper, the author relates their findings back to their initial goals for their research and their specific research questions. They also describe the conclusions that they draw based on their findings and the particular contributions their work has made. Additionally, they discuss the potential significance of their findings, outline the limitations of their study (if not already covered in the Methods or Discussion sections), and propose ideas for future research in their area.
References	Following the body of the paper, the author provides an alphabetical list of the literature they have cited within their paper. The entries in the list are usually formatted according to a particular citation style, such as APA.

Appendices	<p>Although rarely included in information behavior journal articles, appendices can be incredibly useful for the reader. Appendices might contain items such as the full text of a survey that was administered to participants, a list of the questions posed to interviewees (sometimes called an “interview protocol”), a guide that the researchers developed to give structure to a field observation that they conducted (often called an “observation guide”), or a script that the authors developed to use as they conducted an experiment with their study participants. Frequently, the items in the appendices enable the reader to much more fully understand the methods that the authors employed to conduct their study.</p>
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## CRITIQUING INFORMATION BEHAVIOR STUDIES

In this section, we provide a checklist to assist you in assessing the quality and credibility of an information behavior study. When evaluating an article, you'll want to consider criteria in three categories – information about the author(s), information about the journal, and the quality and credibility of the paper/study itself. [Table 7.3](#) lists some of the criteria that you should be sure to consider within each of these categories.

**Table 7.3. Checklist for Assessing the Quality and Credibility of a Scholarly Journal Article Reporting an Information Behavior Study**

Category	Criteria
<i>1. About the author(s)</i>	<ul style="list-style-type: none"> <li>• Who are the authors?</li> <li>• What are their qualifications? (e.g., Master of Library &amp; Information Science; PhD in Information Studies)</li> <li>• What are their job titles and affiliations? (e.g., Academic Reference Librarian at McKeldin Library, University of Maryland; Assistant Professor at University of Maryland College of Information Studies)</li> </ul>
<i>2. About the journal</i>	<ul style="list-style-type: none"> <li>• What is the name of the journal in which the paper was published?</li> <li>• Use Google to find the home page for the journal and answer the following questions: <ul style="list-style-type: none"> <li>◦ Who is the publisher? Is the publisher reputable?</li> </ul> </li> </ul>

- What are the scope and aims of the journal?
- Who is the editor of the journal? What are their qualifications?
- Who is on the editorial board of the journal? What are their qualifications?
- How long has this journal been in publication?
- Is the journal peer reviewed? If so, how is the peer review process conducted? (This is very important, as a journal that does not use peer review may publish poor-quality work and/or may be a “predatory journal,” meaning that the publisher is willing to publish an author’s work (regardless of quality) if the author will pay them to do so.)
- In what databases has the journal been indexed? (Most LIS journals are indexed in well-known databases, such as ABI/INFORM Collection (ProQuest); Academic Search (EBSCO Publishing); Computer Abstracts (Emerald); Computer Science Index (EBSCO Publishing); Current Contents: Social & Behavioral Sciences (Clarivate Analytics); Education Collection (ProQuest); Expanded Academic ASAP (GALE Cengage); InfoTrac (GALE Cengage); ISTA: Information Science & Technology Abstracts (EBSCO Publishing); Journal Citation Reports/Social Science Edition (Clarivate Analytics); Journal Citation Reports/Science Edition (Clarivate Analytics); Library & Information Science Collection (ProQuest); Library Literature & Information Science Index (EBSCO Publishing); LISTA: Library, Information Science & Technology Abstracts (EBSCO Publishing); MasterFILE Elite (EBSCO Publishing); MasterFILE Premier (EBSCO Publishing); ProQuest; SCOPUS (Elsevier); Social Science Premium Collection (ProQuest); Social Sciences Citation Index (Clarivate Analytics); Technology Collection (ProQuest); The DBLP Computer Science Bibliography (University of Trier); and the Web of Science (Clarivate Analytics).)
- What is the impact factor of the journal? (A journal’s impact factor is a measure of how many times, on average, an article in their journal gets cited by other researchers over a specified period of time (frequently 1 year or 5 years) since the appearance of the paper in their journal. Current journal impact factors can be obtained by going to the home page of a particular journal online. Also, you can obtain

and compare impact factors for journals in our field by generating the Journal Citation Report for the category “Information Science & Library Science.” To access Journal Citation Reports, log in to the library database “Web of Science” and then select “Journal Citation Reports” from the menu across the top of your screen. Please note, however, that there are some very high-quality open-access journals (journals that are freely available online to anyone who would like to read them) that do not have impact factors. First Monday (<https://firstmonday.org>) and Information Research (<http://www.informationr.net/ir>) are two examples of very reputable, peer-reviewed, open-access journals that frequently include information behavior studies. For open-access journals, you will need to carefully investigate the author criteria listed earlier, the other criteria listed in this section about the journal, and the criteria listed in the “About the paper/study” portion of [Table 7.3](#) that pertain to the actual paper/study.)

### *3. About the paper/study*

<ul style="list-style-type: none"> <li>• Title</li> </ul>	<ul style="list-style-type: none"> <li>• Is the title clear and concise?</li> <li>• Does the title convey an accurate picture of what the article is about?</li> <li>• Is the title broad enough to clearly convey the entire scope of the article, but not so overly broad that it overpromises what the reader can expect from the paper/study?</li> <li>• Does the title contain any of the keywords that frequently signal that an article is about an information behavior study? (e.g., information needs, information seeking, information behavior, information use)</li> </ul>
<ul style="list-style-type: none"> <li>• Abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Has the author provided a brief abstract of about 1 to 2 paragraphs?</li> <li>• Does the abstract briefly introduce the reader to the topic of the paper, describe the research problem and research questions the authors investigated, list any hypotheses the authors might have posed, detail the methods the authors used to conduct their investigation, summarize the major findings from the study, and discuss the implications of these findings?</li> <li>• Does the abstract successfully address the “so what” or “why should I care” questions? (that is, are you motivated to read their paper after you read their</li> </ul>

	abstract? Do you buy that the author's work is important and potentially impactful in some way?)
• Introduction	<ul style="list-style-type: none"> <li>Has the author provided a much more detailed description of the topic of their paper?</li> <li>Is there information in this section that helps you to get a general sense of what has already been done in this area of research?</li> <li>Did the author describe the research problem they investigated?</li> <li>Did the author list the specific research questions that their study was designed to address?</li> <li>Did the author list their specific hypotheses? (only if relevant: Information behavior studies more commonly explore research questions, rather than test predetermined hypotheses.)</li> <li>Has the author convinced you that their research problem and research questions are important to address? (Here's that "so what" question again!)</li> <li>Did the author describe their goals and objectives for their research?</li> </ul>
• Literature Review	<ul style="list-style-type: none"> <li>Has the author presented a well-synthesized summary of relevant studies that have been conducted by other researchers working in this area? It's a good idea to conduct a search in Google Scholar (<a href="https://scholar.google.com">https://scholar.google.com</a>) to confirm that the author has not neglected to include directly relevant studies (that were published before the date of their own paper).</li> <li>Did the author identify some of the major themes that appear across studies conducted by various researchers?</li> <li>Has the author provided properly formatted in-text citations? (e.g., "Smith (2012) found that..."; "Cancer patients use social media to share their experiences with others (Smith, 2012).")</li> <li>If the author has used direct quotes from the work of other researchers, have they properly cited the source? (e.g., Smith (2012) stated, "Cancer patients avidly read the blogs of other people who have cancer" (p. 32).)</li> <li>Has the author identified the gap in the literature that they are aiming to address through their own research?</li> <li>Has the author convinced you that this gap is important to address? (the "so what" question yet again!)</li> </ul>
• Methods	<ul style="list-style-type: none"> <li>Did the author describe their overarching research design?</li> </ul>

	<ul style="list-style-type: none"> <li>• Has the author described in detail the methods they used to recruit participants for their study?</li> <li>• Did the author explain the method(s) they used for collecting their data from study participants? (e.g., interviews, observation, survey)</li> <li>• Did the author provide a description of how they went about analyzing this data?</li> <li>• Has the author described how they protected their study participants? For example, how did they secure informed consent from them? How did they protect their privacy?</li> <li>• Has the author successfully convinced you that their recruitment, data collection, and data analysis methods were appropriate, given their selected research problem, research questions, and, if applicable, hypotheses?</li> </ul>
<ul style="list-style-type: none"> <li>• Findings (or Results)</li> </ul>	<ul style="list-style-type: none"> <li>• Has the author provided a description of their participants along relevant variables? (e.g., how many people participated? What were their ages, genders, household incomes, and levels of Internet use/experience?)</li> <li>• Has the author identified central themes in their findings and then presented specific results pertaining to each of these themes?</li> <li>• Has the author used their results to effectively answer each of the research questions they had initially posed for their investigation?</li> <li>• Did the author provide evidence for each of their findings? Examples of evidence may include direct quotes from study participants and statistical results.</li> <li>• Did the author include any tables, charts, infographics, or figures that might help the reader to better understand their findings?</li> </ul>
<ul style="list-style-type: none"> <li>• Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Has the author summarized their findings, relating them back to their research questions?</li> <li>• Has the author tied their findings back to the existing literature, pointing out which of their findings supports which prior findings, which of their findings contradict which prior findings, and which of their findings are completely novel?</li> <li>• Did the author discuss the potential meanings and importance of their results?</li> <li>• Has the author described the limitations of their study? All studies have limitations, and it is important for researchers to honestly communicate the specific limitations of their study to their readers. Note that authors will sometimes describe the limitations of their</li> </ul>

	<p>study in the Methods or Conclusion section of their papers, rather than in the Discussion section. Some common limitations of information behavior studies include:</p> <ul style="list-style-type: none"> <li>◦ A small and/or biased sample (e.g., participants included students from just one university), which leads to an inability to generalize one's findings beyond one's particular sample (an author shouldn't claim that their findings based on data collected from students at University X apply to all university students everywhere);</li> <li>◦ Relying on participant self-report, which may result in erroneous or incomplete participant responses, whether due to memory lapses, misunderstanding the researchers' question, or simply being unwilling to share an (honest) answer with the researcher;</li> <li>◦ Encountering participant reactivity (this is when participants intentionally or unintentionally change their responses or behavior while participating in a study), which may impact the trustworthiness of the author's findings. For example, if you ask someone in an interview if they have ever shoplifted, they may be unwilling to admit to this socially undesirable behavior. Thus, this tendency for data to reflect socially acceptable (rather than truthful) responses has been labeled "social desirability bias."</li> </ul>
• Conclusion	<ul style="list-style-type: none"> <li>• Has the author briefly related their findings back to their initial research goals and research questions?</li> <li>• Has the author drawn some conclusions based on their findings?</li> <li>• Can every conclusion the author has drawn be clearly traced back to their findings and the evidence that they have provided earlier in their paper?</li> <li>• Has the author discussed the potential implications and significance of their study and their findings?</li> <li>• Has the author provided some specific ideas for future research in this area? Frequently, these ideas may suggest ways around the limitations the author has identified in their own study.</li> </ul>
• References	<ul style="list-style-type: none"> <li>• Has the author provided an alphabetical listing of all of the works (and only the works) they cited within the body of their article?</li> <li>• Have they used the proper style (e.g., APA style) to format their entries in this list?</li> </ul>

	<ul style="list-style-type: none"> <li>• Does the reference list show that the author has (also) included literature that was recent as of the time when they wrote the article? For example, if a 2020 article lists only citations prior to 2010, this suggests that the author's literature review is likely outdated and incomplete. You'll want to be aware of this as you read the paper and consider its credibility.</li> </ul>
• Appendices	<ul style="list-style-type: none"> <li>• Has the author included any appendices that may be helpful for the reader? Although appendices are rarely included in information behavior articles, they can be incredibly useful for giving the reader a fuller picture of the methods the authors used, the findings they obtained, etc.</li> <li>• Are there any documents that the author might have provided that would have helped you out, such as the full text of a survey they administered, their interview questions, their observation protocol, or a script they used as they conducted their experiment?</li> <li>• If the author did include appendices, did they mention and describe the content of each of them within the body of their paper?</li> </ul>

## ANNOTATED SAMPLE OF AN INFORMATION BEHAVIOR STUDY

In [Table 7.4](#), we have annotated a small, informal information behavior study that was carried out by one of the authors of this book (working with one of her classmates) when she was a student pursuing her Master of Science in Information (MSI) degree at the University of Michigan School of Information. We have annotated the various sections of the study, using the checklist ([Table 7.3](#)) as a guide.

**Table 7.4. Annotated Information Behavior Study**

<p style="text-align: center;"><b>Attitudes, Motivations, and Information Behavior of e-Shoppers</b></p> <p style="text-align: center;"><b>by Beth St. Jean &amp; Moises Curiel, MSI students, University of Michigan School of Information</b></p> <p style="text-align: center;"><b>April 2005</b></p>	<p>The title is clear and concise, and matches the scope of the paper. The title includes the phrase "information behavior."</p> <p>The authors are MSI (Master of Science in Information) students at the University of Michigan School of Information (UMSI).</p> <p><b>Notice that this paper was written quite a while ago.</b> Although it's important to note this, you'll also want to keep in mind that many older studies contain very valuable (and sometimes still applicable, as well!) findings.</p> <p><b>No abstract has been provided for this paper.</b> This is unsurprising, as this is a student paper written just for a class; however, most scholarly journal articles will include an abstract.</p>
<p><b>1 Introduction</b></p> <p>Using the Internet to research and make purchases of goods and/or services has become a fairly commonplace activity for many Americans. In fact, a 2004 study by the USC Annenberg School Center for the Digital Future found that 43% of all adults who used the Internet in 2003 used it to make online purchases (2004, 56). This study also found that adults who have used the Internet longer are more likely to make purchases online (p. 58) and that the percentage of Americans who use the Internet has been steadily trending upwards (p. 28). Taken together, these two trends lead to the prediction that online purchasing will continue to grow.</p> <p>What is an "e-shopper"? E-shoppers include people who make purchases of goods and/or services online. E-shoppers can also include people who use the Internet to research possible future purchases of goods and/or services. And, of course, e-shoppers include people who engage in both of these types of behaviors. E-shoppers often mix and match their use of online stores and brick-and-mortar stores. It is not uncommon for a person to shop online and then make the subsequent purchase in a physical store. The reverse is also not unusual; many people browse in traditional stores and then make their subsequent purchases online (USC Annenberg School Center for the Digital Future, 2004, 60). Therefore, the term "e-shoppers" will be used here to include both Internet shoppers and Internet purchasers.</p>	<p>In this section, the authors have introduced their topic (online shopping) and provided the reader with some general findings about Americans' online shopping behaviors. The authors describe that their goal was to learn about e-shoppers' information behavior and how they feel about shopping online and why they choose to do so; <b>however, they have not specified any particular research problem or listed any particular research question they set out to investigate. Also, they have not listed any hypotheses.</b> However, this is unproblematic, as this study is described as being more exploratory, rather than an attempt to confirm some specific hypotheses.</p>

<p>Because of the information-intensive nature of e-shopping and because of its ubiquity (particularly among SI students!), we decided to conduct a study of the information behavior of e-shoppers. We were interested not only in e-shoppers' information behavior, but also in how they feel about shopping online and why they choose to do so. We chose to limit our sample by defining an e-shopper to be a person who has purchased at least one good or service online within the past 6 months.</p> <p>In order to perform this study, we conducted ethnographic interviews with 5 subjects (including one pilot subject with whom we conducted an interview in order to test and refine the list of interview questions that we had developed).</p>	<p><b>Have the authors answered the "so what" question? After reading this introduction, do you think you are likely to learn something important if you read the entire paper?</b></p>
<p><b>2 Literature Review</b></p> <p>Before conducting the ethnographic interviews with our subjects, we first surveyed the available literature on the attitudes, motivations, and information behavior of e-shoppers. The articles that we reviewed spanned the fields of Human-computer Interaction, Marketing, e-Commerce, Psychology, and Consumer Research. After reading these articles, we composed a list of interview questions that would get at interesting themes woven throughout the literature of these various fields. When we subsequently conducted our interviews, transcribed them, and began to analyze them, we noticed that three of the themes that we had seen throughout the literature were highly prevalent throughout our interviews, as well. These three themes are: (1) People often don't know and/or are unable to precisely describe what it is they are looking for; (2) Information search costs affect consumer behavior; and (3) Perceptions of trustworthiness affect consumer behavior. Below, we have listed and described the articles which fell within each of these themes.</p>	
<p><b>Theme 1: People often don't know and/or are unable to precisely describe what it is they are looking for</b></p> <p>Many studies discuss the important fact that people have a difficult time not only expressing what they need, but knowing what they need. Belkin et al. (1982) refer to this concept as ASK ("Anomalous States of Knowledge"). The ASK hypothesis states that a user's information need comes about due to an anomaly in his/her knowledge about a certain topic or problem area. Since the information need is due to a gap or inconsistency in the user's knowledge, it is often difficult for a user to describe his/her information need. Belkin et al. criticized the current-day information retrieval systems that forced the user to express what they did not know, rather than what they did know. Although this article was written well over 20 years ago, many of the information retrieval mechanisms available to e-shoppers still impose this requirement upon users.</p>	<p>The authors have identified three major themes in the literature they reviewed and then provided a summary of relevant literature organized around each of these themes.</p> <p>The authors have provided properly formatted in-text citations (e.g., "Belkin et al. (1982)")</p>

Bates (1989) challenges the traditional information retrieval model which posits that information search consists of simply a one-time query. She proposes her own model of information search, which she calls "Berrypicking." The major point in the model is that searching consists of much more than a one-time query. Searchers retrieve bits and pieces of information, use a variety of search approaches, and use a variety of sources of information. Additionally, searchers' needs tend to evolve during the information search process. Based on her findings about user search behavior, the author calls for a shift in the design of databases and search interfaces. She also discusses the various user browsing techniques that should be facilitated by information systems. The concept of Berrypicking can also be applied to Internet shoppers, as e-shopper's behavior fits in well with this model.

Reminiscent of both Belkin et al.'s ASK concept and Bates' Berrypicking Model, Rowley (2000) states that e-shoppers often start out unsure of what it is that they are looking for. As they continue in their information search process, e-shoppers are likely to iteratively redefine their information needs and to refine their representations of these needs. Rowley points out that a user's choices of tools, sources, and information-seeking behaviors during the information search process will impact the outcome of his/her search. Suboptimal choices of tools, sources, and behaviors may lead to information overload and a search that is prematurely terminated.

A study done by Chen and Chang (2003) also deals with the phenomenon that people are often unsure of what they want. These researchers interviewed 35 U.S. consumers in order to understand how people e-shop and how they feel about their e-shopping experiences. They state that online shopping is convenient for both consumers who know what they need and for those who do not. They contend that people who aren't sure what they need can solve this problem by simply using the Internet to access product comparisons. However, it is often not as simple as these authors imply! How do people know where to go to find product comparisons? If they're unsure of the product name that they are looking for, how do they know which products to try to compare?

Based on their interviews with e-shoppers, Chen and Chang identified three major factors that influence a consumer's online shopping experience: (1) Interactivity, (2) Transaction, and (3) Fulfillment. The "Transaction" factor includes a measure representing the availability of product information and the ability to perform customized product comparisons. This factor was found to have the most profound effect on an e-shopper's overall satisfaction with the online shopping experience.

Combining the implications of the four studies described above, an e-shopper's ASK may be at least partially solved by the incredible amount of product information and product comparison data available on the Internet. However, this information must be made easily accessible in order for e-shoppers to avoid being overwhelmed by it and to realize the benefit of it.

### ***Theme 2: Information Search Costs Affect Consumer Behavior***

Many articles on Internet shopping report that the lower cost of searching for information on the Internet will result in more price search by consumers. However, several studies have found that people will seek to limit their information search costs and may even be willing to pay slightly higher prices in exchange for these reduced information search costs.

Khalifa et al. (2003) conducted focus group meetings and conducted two online surveys in order to identify the most important factors affecting online shopping. They found that both the facilitating conditions (such as product description and website accessibility) of the e-shopping experience and a consumer's online shopping intentions affect the frequency with which the consumer will shop online. Further, they determined that, of these two factors, the facilitating conditions had the greater impact. A consumer's intention to shop online only has a small effect on their subsequent e-shopping behavior. If facilitating conditions are not present, the consumer's intent may not translate into action. Thus, the facilitating conditions of the e-shopping environment, such as transaction efficiency, product description, and navigation efficiency, are far more potent predictors of online shopping behavior. The "facilitating conditions" set forth by these authors are likely to result in reduced information search costs for e-shoppers.

Jiang (2002) identified three factors that drive an online price search: (1) Perceived Search Efficiency, (2) Motivation to Price Search, and (3) Perceived Benefits of Search. She further identified some variables which positively or negatively affect each of these three factors. Jiang found that price becomes less important to consumers who are provided with detailed "non-price" information. Consumers who are able to quickly find the company and product information that they need in order to make a purchase decision are less likely to engage in a subsequent search to perform price comparisons.

Notice the last paragraph in each of the subsections. There is a synthesized summary of the relevant findings for each of the themes.

Klein et al. (2003) surveyed 171 automobile buyers and 168 automobile shoppers in order to find out about their information search process. They found that the reduced cost of information search and the increased availability of information brought about by the Internet have changed Consumer Information Search (CIS) behavior. Whereas the major cost factor of CIS used to be time spent searching for information, it is now more the cognitive costs incurred during the search. In other words, the problem is not so much finding information anymore, but understanding, assimilating, and evaluating vast amounts of it from many different sources. This extracts huge cognitive expenditures from consumers. However, Klein et al. point out that consumers can strive to reduce these costs by choosing particular types of information sources that impose a lower cognitive load.

Hoque and Lohse (1999) conducted a study in order to see if the costs of information search impact consumer choice. They recruited 177 students and divided them into 3 separate groups. They then had each of these groups use a different version of a yellow pages directory in order to select the one business that they would be most likely to patronize. The first group was provided with a traditional paper version of the yellow pages directory. The second group was provided with a GIF version (the pages of the paper version converted to GIF files). The third group was provided with a hyperlink version (the format used by most online yellow page services). The authors found that information search costs play a crucial role in consumer choice behavior. For example, the subjects using the GIF version were more likely than those using the hyperlink version to choose a business near the top of the file. The GIF version required users to manually scroll through the entire file in order to see entries for businesses near the end of the alphabet. The hyperlink version, on the other hand, enabled users to obtain one-click access to any business on the list, regardless of where the name fell alphabetically. Thus, GIF version users accrued additional information search costs the further they went down the list while hyperlink version users faced approximately the same amount of information search costs no matter what business they chose to look at. The GIF version users were willing to be less picky about which business they selected in order to try to avoid some information search costs.

The four studies cited above lead us to the conclusion that e-shoppers are likely to make sacrifices of another kind in order to save on information search costs. For example, they may be willing to buy from a little-known company and/or to pay higher prices if, by doing so, they are able to reduce their information search costs.

Notice the last paragraph in each of the subsections. There is a synthesized summary of the relevant findings for each of the themes.

### ***Theme 3: Perceptions of Trustworthiness Affect Consumer Behavior***

Many articles emphasize the central role of user perceptions about trustworthiness in predicting willingness to purchase online. Users must have some degree of trust not only in the Internet in general, but also in the e-tailer and its website before they will proceed to make an actual purchase on the e-tailer's website.

George (2002) uses the Theory of Planned Behavior (TPB) as the theoretical framework in conducting a survey to determine if people's beliefs about privacy, Internet trustworthiness, and experience have affected their attitude toward making Internet purchases. One of the strongest positive correlations that he found was that between an individual's beliefs in the trustworthiness of the Internet and his/her attitude toward Internet shopping. In other words, people who trust the Internet are more likely to shop online.

Fogg et al. (2001) conducted a large qualitative study in order to determine which elements of a website affect its perceived credibility. They found that "real-world feel," "ease of use," "expertise," "trustworthiness," and "tailoring" are associated with higher perceptions of credibility, while "amateurism" and "commercial implications" are associated with lower perceptions of credibility. In order to e-shop, users must visit websites with "commercial implications," so this factor may have a less negative effect on the perceptions of e-shoppers. The factors positively correlated with perceptions of credibility are likely to be quite important to e-shoppers. E-shoppers may not be willing to shop on sites that lack these characteristics.

Lee (2002) surveyed 424 online purchasers in order to create a model of their behavior. He identified several factors that affect the likelihood that someone will purchase online (e.g., whether the person has shopped online before and how knowledgeable he/she is about the Internet). The behavioral model Lee constructed consists of the following phases: (1) Building Trust and Confidence, (2) Online Purchase Experience, and (3) After-Purchase Needs. During each phase, shoppers have different information needs. During the first phase, shoppers research the company and its product offerings. The fact that he found "Building Trust and Confidence" to be the initial phase of an online purchase highlights the importance of not only the level of professionalism of the e-tailer's website, but also the ease-of-access and extent of company and product information made available to potential buyers. E-shoppers who encounter a problem or difficulty in this phase with a particular e-tailer are likely to abandon the e-tailer's website before reaching the second phase.

Notice the last paragraph in each of the subsections. There is a synthesized summary of the relevant findings for each of the themes.

<p>The three articles discussed above all emphasize the central importance of e-shoppers' perceptions about the trustworthiness of both the Internet and specific e-tailers and their websites. Therefore, people's willingness to make purchases online is highly dependent on the amount of trust they feel in both the situation and the e-tailer.</p>	<p><b>The authors have not identified the gap in the literature they were aiming to address with their study. As a result, we do not know what this gap is or whether or not it is an important gap to address.</b></p>
<p><b>3 Methods</b></p> <p>In order to study the information search behavior of e-shoppers, we performed a literature search in order to identify relevant articles of interest, prepared annotated bibliographies, and composed a draft list of interview questions. We then recruited a pilot subject in order to try to gauge the appropriateness (in terms of both quantity and relevance) and clarity of our interview questions. The pilot subject was not recruited randomly; he is an SI student that we both know. We conducted the pilot interview in a conference room on the fourth floor of the Shapiro Library. It went quite well, so after making a few additions, deletions, and minor changes to our interview questions, we were ready to perform the "real" interviews.</p> <p>We recruited four subjects for our ethnographic interviews. Again, these subjects were not recruited randomly. Three of them were fellow SI students and one of them was a Computer Programmer for a large financial software company. We held all but one of these interviews at the Shapiro Library. We would have liked to have conducted them at the subjects' homes as that is probably where most of them conduct their e-shopping; however, due to time considerations, we did not make this request. The remaining interview we were able to conduct at the subject's home. We tape-recorded each of these interviews with the consent of the interviewees.</p> <p>Subsequently, we transcribed all five of the tape-recorded interviews using Microsoft Word. We made the decision to go ahead and transcribe our pilot subject's interview and to include the data from his interview in our results section as the changes we subsequently made to our list of interview questions were fairly minor. To protect confidentiality, we went through the transcripts and substituted "xxx" any time an interviewee mentioned someone's name. Additionally, we substituted subject numbers for each of the interviewee's names. The subject numbers were assigned according to the order in which we conducted the interviews.</p> <p>Although the transcripts we prepared were easier to use than the recordings when trying to analyze the data, we found that the transcripts often failed to convey everything that could be ascertained by listening to the tape-recordings. Sometimes the meaning of sentences appeared to be completely changed due to the lack of cues such as tone of voice, facial expressions, and gestures.</p>	<p>The authors first describe a pilot study they conducted in order to ensure that their interview questions were appropriate (in terms of both quantity and relevance) and clearly worded.</p> <p>The authors describe how they recruited participants for their study, the data collection method they used (interviews), and the procedures they used to collect and analyze their data. <b>However, they have not described why their methods were appropriate, given the nature and goals of their study.</b></p> <p>The authors describe how they protected their participants' confidentiality.</p>

<p>Shortly after conducting these interviews, we used our memories to come up with a list of patterns that we had noticed across multiple interviews. We then used NVivo to analyze the transcripts to find support for the existence of these patterns. We also used NVivo to identify additional patterns that we hadn't recalled. The patterns that we discerned are described in the Results section below.</p>																									
<p><b>4 Results</b></p> <p>We noticed many themes that recurred throughout many of our interviews. The table below lists some of the many patterns that we noticed.</p> <table border="1"> <thead> <tr> <th>Finding (about people in our sample)</th><th>Relevant Subjects</th></tr> </thead> <tbody> <tr> <td>• People's favorite search engine is Google</td><td>S1, S2, S3, S4, and S5</td></tr> <tr> <td>• Dogpile is one of the alternative search engines used by Google users</td><td>S1 and S3</td></tr> <tr> <td>• People use intermediaries to do their searching and/or serve as intermediaries to help others with their searching</td><td>S2 and S3</td></tr> <tr> <td>• People buy from <a href="#">Amazon.com</a></td><td>S1, S2, S3, S4, and S5</td></tr> <tr> <td>• People aren't that enamored with e-Bay</td><td>S1, S2, S3, S4, and S5</td></tr> <tr> <td>• Professional appearance of an e-tailer website is quite important to e-shoppers</td><td>S2, S3, and S4</td></tr> <tr> <td>• Many people who don't like shopping are more willing to browse around online</td><td>S1, S2, and S3</td></tr> <tr> <td>• Convenience is perceived as the most important difference between traditional and online shopping</td><td>S1, S2, S3, S4, and S5</td></tr> <tr> <td>• People often get product information from one place, but purchase the product from some other place</td><td>S1, S2, S3, and S4</td></tr> <tr> <td>• People like to stick with what they know (e.g. brands/websites/) and to some degree, they are willing to pay more to do so</td><td>S1, S2, S3, and S4</td></tr> <tr> <td>• People are concerned about privacy and security issues on the Internet, but may not act on this concern</td><td>S1, S3, and S5</td></tr> </tbody> </table>	Finding (about people in our sample)	Relevant Subjects	• People's favorite search engine is Google	S1, S2, S3, S4, and S5	• Dogpile is one of the alternative search engines used by Google users	S1 and S3	• People use intermediaries to do their searching and/or serve as intermediaries to help others with their searching	S2 and S3	• People buy from <a href="#">Amazon.com</a>	S1, S2, S3, S4, and S5	• People aren't that enamored with e-Bay	S1, S2, S3, S4, and S5	• Professional appearance of an e-tailer website is quite important to e-shoppers	S2, S3, and S4	• Many people who don't like shopping are more willing to browse around online	S1, S2, and S3	• Convenience is perceived as the most important difference between traditional and online shopping	S1, S2, S3, S4, and S5	• People often get product information from one place, but purchase the product from some other place	S1, S2, S3, and S4	• People like to stick with what they know (e.g. brands/websites/) and to some degree, they are willing to pay more to do so	S1, S2, S3, and S4	• People are concerned about privacy and security issues on the Internet, but may not act on this concern	S1, S3, and S5	<p>The authors have identified central themes that arose in their findings and, for each theme, listed the specific transcripts in which the themes arose; <b>however, the authors have not provided any information about their participants</b> (beyond what they already mentioned in the Methods section). It would be helpful to know some relevant factors about the study participants, such as their ages, gender, household incomes, Internet use/experience, and extent of experience with online shopping.</p> <p>The authors include a table to help communicate to the reader the list of patterns they identified in their data, along with the prevalence of each of these findings among their participant sample. The reader can see at a glance which themes were mentioned by all or nearly all participants and which were mentioned by just two of them.</p> <p>Throughout this section, the authors share multiple participant quotes to provide evidence for each of their findings.</p> <p>Note the use of "xxx" to protect the confidentiality of the participant. In professional papers, you'll frequently see something like "I01" (Interviewee number 1), "P01" (Participant number 1), or "S01" (Subject number 1).</p>
Finding (about people in our sample)	Relevant Subjects																								
• People's favorite search engine is Google	S1, S2, S3, S4, and S5																								
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Finding (about people in our sample)	Relevant Subjects
• People rely on customer feedback about merchants and products provided by other users	S1, S2, S3, S4, and S5
• People have specific ideas about what types of tools would improve their e-shopping experience	S1, S2, S3, S4, and S5

Our subjects' comments on their use of search engines had several common themes. All five subjects stated that their favorite search engine was Google. They all praised Google quite highly. In fact, S4 stated, "I pretty much don't use anything else" and S5 stated, "Google is my homepage." Two of our five subjects stated that when Google doesn't work for them, they often turn to Dogpile. One subject mentioned Ask Jeeves and another mentioned Lycos as their second-choice search engine.

Two of our subjects (S2 and S3) mentioned using or serving as intermediaries to help in the information search process. S2 stated, "I use xxx to search for me because I can't find anything on my own."

All of our subjects specifically mentioned Amazon when asked what online stores they purchase from. S3 stated, "I always check Amazon to see what kind of books are coming out." On the other end of the spectrum, four of our five subjects expressed negative sentiment about eBay. Both S3 and S5 had used eBay; however, S3 was unhappy with the product that she ended up with and S5 never received her product even though she sent payment. S1 and S2 both expressed fear of eBay. S1 stated, "I've never used eBay 'cause eBay scares the hell out of me!"

Three of our five subjects (S2, S3, and S4) pointed out that the appearance and usability of an e-commerce website is quite important. S4 stated, "... [if] I'm not familiar with the company, if it is really ugly or obnoxious advertising, it completely turns me off." S3 stated, "Like if their website is shoddy, you don't know what customer service is going to be like."

Three of our five subjects (S1, S2, and S3) stated that they abhorred shopping in traditional stores but didn't mind shopping online. S2 told us, "I hate shopping! I hate shopping! If you want to punish me, you'll take me to the mall and make me walk back and forth and stare at all the !@#%."

In the course of all of our interviews, each interviewee mentioned the convenience of shopping online at least once. S2 stated, "It's just really convenient. I mean, you can decide at 10 o'clock on a Sunday night that you need [flower] bulbs really bad."

Four of our five subjects (S1, S2, S3, and S4) all mentioned an incident in which they gathered information about a product from one place, but made the subsequent purchase from another place. S1 began researching a computer purchase at a traditional store but ended up making the purchase online. S2 used one website to look up information about a product and then made her purchase on a competitor's website. She did this because the first website had much more product information than the second website, while the second website offered a price that was far better than the first website. S3 has looked up products on Amazon and then gone to a local used bookstore to make her purchase. S4 mentioned that she often researches purchases online and then makes her purchases at local stores.

The same four subjects (S1, S2, S3, and S4) mentioned the importance of sticking with things that they know and believe to be reputable, especially in terms of brands and websites. They indicated that they would be willing to pay more to be able to do so. However, one of these subjects (S3) stated that brand was important to her only for some products (such as electronics). S2 said, "So you try a brand like, I only eat Best Foods mayonnaise or Hellman's it's called here - because that's what I grew up with and if they changed the formula, I would have a fit. I wouldn't know what to do with mayonnaise."

Three of our subjects (S1, S3, and S5) mentioned that they have some concern about privacy and security on the Internet. S3 stated, "I'm really paranoid. I'd say I'm paranoid but I don't take any measures to protect myself."

All of the subjects in our sample told us that they look at customer ratings of products and/or companies when trying to decide on an online purchase. However, one of our subjects expressed some doubt in them. She told us, "I make my decision by the description, critiques or buyers' comments, which I have no idea who wrote them."

When interviewing all of our subjects, we asked each of them to tell us if there was any tool or program that would make e-shopping easier for them. The answers we got were quite interesting. S1 told us that he would like to have an intelligent agent that would automate some of his regular online purchases. S2 said that she would like the computer to be telepathic so that it just knew what she was looking for and would help her find it. S3 stated, "No, not really. I guess if there was some way to really be sure that your information was safe, that's the only thing." S4 told us that she would like to be able to control the size of the text on her screen and that she would like to have a "clean interface." S5 had quite a novel idea. She said that she would like to have a permanent shopping basket on her computer into which she could put purchases from all different websites. When she wanted to proceed to make the purchase, she wouldn't need to try to find the website again. She would have only to open her shopping basket.

<p>These are just some of the many patterns that emerged when we began to analyze our interview transcripts. To a large degree, the plethora of patterns is probably at least partially an indication of the bias inherent in our sample.</p>	<p>There is a brief acknowledgment of an important study limitation here – the sample was quite small and very biased (three SI students and a computer programmer).</p>
<p><b>5 Discussion</b></p> <p>Our methodology consisted of conducting 5 ethnographic interviews with e-shoppers. Although our methodology enabled us to gather data for this project, it had some major drawbacks. Chief among these were the fact that our sample was very small and not representative of the general population. Four of the five people we interviewed were SI students. All of the SI students, as well as the other (non-SI) person that we interviewed were highly computer-literate. This introduced a very strong bias into our sample. Because of this bias, our findings cannot be generalized to any group other than our sample.</p> <p>Another methodological problem we encountered was simply due to the fact that the data people provide in interviews may not be accurate. Self-reported information may be incomplete or even completely incorrect. What people say they do is not always what they do. Language can be tricky and people's use of it does not always express what they are trying to express. For example, one interviewee (S2) stated, "And like e-Bay – I'm very scared of eBay. I try really hard not to ever use it because I don't trust that it's legitimate because random whoever can set up a website and Lord knows what they're up to. So I don't feel like there's much of a guarantee." When I was analyzing this transcript, this sentence seemed to mean that the person was sometimes forced to use e-Bay. I contacted the subject and she told me that she had meant that she doesn't use it because she is scared of it and that she has never actually used it.</p> <p>Despite the flaws in our methodology, our findings did hit upon some of the key themes that we found in the literature. For example, we found many examples of people using multiple sources of information (as Bates' Berrypicking model suggests), people judging the credibility of a website based on its professional (or not) appearance (as suggested by Fogg et al., 2001), and that people seek to minimize their risk by sticking with brands and websites that they know (Fogg et al., George, and Lee emphasized the importance of perceived trustworthiness of the Internet and e-tailers and their websites in predicting whether people would purchase online).</p>	<p>The authors summarize their methods briefly here and then provide a much more detailed description of the limitations of their study.</p> <p>The authors summarize some of their key findings and briefly compare and contrast their findings with those of other researchers.</p> <p><b>The authors have not discussed the potential significance of their results;</b> however, they touch on this briefly in the Conclusion.</p>

## 6 Conclusion

The ethnographic interviews that we conducted uncovered many patterns in the attitudes, motivations, and information behavior of e-shoppers. Several of these patterns are ones that are mentioned in the literature relevant to the field of e-shopping. Although our methodology does have some flaws, the findings of this study could be used to make suggestions as to how to improve the e-shopping experience. Some of these suggestions include: (1) Make the Internet environment a safer place to purchase products; (2) Implement better user privacy protections without inconveniencing the user; and (3) Provide users with tools specially designed to help them with e-shopping. Implementation of these suggestions should include repeated consultations with users in order to determine what types of technology they would find helpful and what types of tools they think they would actually be willing to use.

The authors draw some very general conclusions and point out some of the potential ways in which their findings might be put into practice in order to improve the online shopping experience for Internet users.

The authors suggest that future research be conducted to ensure that any changes made to the online shopping process are truly useful for actual users.

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This list of references has been correctly titled "References" and sorted alphabetically by the first author's last name. The entries in this list are all properly formatted, using APA style.

There is an entry in this list for every work that has been cited in the text of the paper, and there are no entries in this list for any works that have not been cited in the paper.

Notice that the latest study included in this list was published in 2004. This is reasonable given that this study was conducted back in 2005.

<p>Lee, P.-M. (2002). Behavioral model of online purchasers in e-commerce environment. <i>Electronic Commerce Research</i>, 2, 75-85.</p> <p>Rowley, J. (2000). Product search in e-shopping: A review and research propositions. <i>Journal of Consumer Marketing</i>, 17(1), 20-35.</p> <p>USC Annenberg School Center for the Digital Future. (2004). <i>The Digital Future Report: Surveying the Digital Future, Year Four</i>. Retrieved April 20, 2005 from <a href="http://www.digitalcenter.org/downloads/DigitalFutureReport-Year4-2004.pdf">http://www.digitalcenter.org/downloads/DigitalFutureReport-Year4-2004.pdf</a>.</p>	
<p><b>Appendix A: Interview Questions</b></p> <ol style="list-style-type: none"> <li>1. Could you please tell us a little bit about yourself?</li> <li>2. What is a typical week like for you?</li> <li>3. How do you prefer to spend your free time?</li> <li>4. Do you have any hobbies? If so, what are they?</li> <li>5. Please describe your experience with computers.</li> <li>6. Please describe your experience with the Internet and with using search engines.</li> <li>7. Are you concerned about privacy and security issues on the Internet?</li> <li>8. Do you have any favorite websites? If so, which ones? How did you find out about them? Why do you like them?</li> <li>9. Can you tell us about your shopping habits in general? How important are price and brand to you?</li> <li>10. Please describe your experience with e-shopping.</li> <li>11. Do you have favorite websites you like to use for e-shopping? If so, how did you come across them? Why do you like them?</li> <li>12. Can you tell us about one of your previous e-shopping experiences?</li> <li>13. Do you ever use any tools or websites that help you to compare prices (such as MySimon)?</li> <li>14. For you, what are the most important differences between traditional shopping and shopping online?</li> <li>15. Can you think of any tool or anything that would make shopping online easier for you?</li> </ol>	<p>The authors have included their interview questions as an appendix to their paper. This is helpful for us as readers, as it enables us to get a better picture of how these interviews might have unfolded. <b>The authors should have referred to this appendix within their methods section</b>, though, in order to let us know that they have included the full list of interview questions at the end of their paper.</p>

## DISCUSSION QUESTIONS

- What are your thoughts about scholarly communication and the peer review process? What are the strengths and weaknesses of such a system?

- If you needed to find as many journal articles as possible that describe investigations into the information behavior of farmers, how would you go about the process?
- Reread the annotated information behavior study ([Table 7.4](#)). Does this paper pass the “so what?” test? That is, do you feel that the authors’ study is important? Why or why not?
- Thinking about the information science career you’re planning to pursue, who are your users likely to be? Using the methods described in this chapter, find and read three journal articles that describe investigations into the information behaviors (whether related to the information needs, information-related preferences, or information-seeking habits) of your user group.
- What search terms did you use?
- How easy/difficult was it to find the articles?
- In the future, what would you do differently when conducting this type of search?
- What did you learn from these studies’ findings that may impact the way in which you work with (or on behalf of) this group?

**Learning Activity:** Reread the story at the beginning of this chapter and identify some of the limitations of Professor Flores’ study. (Inability to generalize due to a small and biased sample (just 30 patients, all from one local cancer clinic); reliance on participant self-report during their interviews with Professor Flores; potential participant reactivity/social desirability bias – Professor Flores’ interviewees may not have been completely honest or comprehensive when answering her interview questions)

## FURTHER READING

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# 8

## Research Methods

*Professor Hutchinson wanted to know how common it is for undergraduate students to look for health information for their parents and what sources they tend to turn to in this type of situation. She prepared a short online survey, asking students at her university to indicate how frequently they look for health information for their parents, on average. Professor Hutchinson provided a 5-point scale for them to answer this question, ranging from 0 (never) to 4 (nearly every day). The second question of the survey asked students to check off which source(s) they had turned to in order to obtain this information. She provided the following choices: (1) Call a doctor; (2) Ask a professor; or (3) Go online. After requesting and receiving approval from her university's Institutional Review Board (IRB), Professor Hutchinson used a university listserv to email a link to the survey to all of the 22,000 undergraduates at her university. A total of 3,000 students completed the survey, representing a response rate of 13.6 percent ( $3,000 / 22,000$ ). After using SPSS (software for conducting statistical analysis) to analyze the data she had collected, she found that 60 percent of the students who had*

*responded look for health information for their parents, and that 10 percent of them do so nearly every day. With regard to sources, Professor Hutchinson found that nearly all of the respondents reported going online to gather this information, and that less than 10 percent of them reported calling a doctor or asking one of their professors.*

*After learning of Professor Hutchinson's findings, one of her colleagues, Professor Hameed, wanted to further investigate why undergraduates look for health information for their parents, as well as their reasons for turning to a specific source (particularly the Internet) to obtain this information. After requesting and receiving IRB approval, Professor Hameed used the same listserv to recruit some undergraduate students for in-person interviews. Fifteen students agreed to a 1-hour interview and consented to have their interview audio-recorded. Professor Hameed was able to explore in-depth with each of these participants their motivations for searching for health information for their parents and their reasons for turning to particular sources to get this information. Furthermore, he was able to probe (that is, ask follow-up questions) whenever he felt an interviewee's answer did not provide enough information and whenever an interviewee mentioned something that was of particular interest to him. After each interview, Professor Hameed transcribed the audio-recording, typing both sides of the conversation into a Word document. At the conclusion of the study, he imported all 15 interview transcripts into NVivo, software that facilitates analysis of qualitative data. Upon analyzing his data and identifying trends across his 15 interviews, Professor Hameed found that, most frequently, students were motivated to look for health information for their parent when the parent was experiencing some type of symptom. The second most common motivation was when a parent had explicitly asked them to do so. He also found that his interviewees largely turned to the Internet because they felt it was the most convenient source; however, he also learned that a considerable number of his interviewees actually called their health*

*insurance's ask-a-nurse service and that some went to their local public library to look at books and magazines that might contain relevant information.*

\* \* \*

In this chapter, we will explore the many methods that information behavior researchers and other types of information professionals use to conduct research. Professor Hutchinson's study is an example of quantitative research; Professor Hameed's study is an example of qualitative research. Generally, quantitative research methods deal with numeric data and enable a researcher to answer more objective types of questions, such as "how much," "how many," and "how often." In contrast, qualitative research methods deal with textual and/or visual data and are far more suitable for more subjective types of questions that focus on people's perceptions and personal experiences, such as "why" and "how." Although these two types of research may appear to be completely different, the truth is that the line between quantitative and qualitative research can get quite blurry. Researchers frequently weave both quantitative and qualitative methods into the same study in order to increase both the accuracy and comprehensiveness of their findings. Sometimes this is referred to as "mixed methods" research.

We open this chapter with a definition of research and research design, followed by a general outline of the research process. We then discuss, in turn, the various methods that people use to conduct research, including recruitment methods, data collection methods, and data analysis methods. Next, we discuss the implications of a researcher's choice of research methods for the quality of their findings. To conclude the chapter, we discuss the ethics of research, including the important role of the Institutional Review Board (IRB) and the ethical considerations researchers need to take into account when designing and carrying out their investigations.

## **DEFINING “RESEARCH” AND “RESEARCH DESIGN”**

When you think of the term “research,” what comes to mind? Perhaps the term paper that you wrote for your history class last semester? In this chapter, we focus on research as the process of gathering knowledge that was previously unknown to anyone. So conducting research in order to write your history paper would not fit into this definition, as you likely gathered known information from multiple sources in order to write your paper. Although the information you gathered may have been previously unknown to you (and others, such as your teacher, your parents, and your friends), someone (at the very least, the author(s) of your sources!) already knew it. In this chapter, we discuss research as the processes someone uses to gather new knowledge about something in the world. In the earlier examples of Professors Hutchinson and Hameed, they were both embarking on a systematic investigation to gain new knowledge about undergraduates’ information behavior in a specific situation – knowledge that was not yet held by anyone.

To conduct such systematic investigations, much thought must be put into the design of a research study. First, a researcher needs to identify some type of research problem. For example, Professor Hutchinson wanted to design a study that would address the gap in our knowledge about how common it is for undergraduates to seek health information for their parents and what sources they tend to use when doing so. Next, the researcher needs to identify particular research questions they would like to address or hypotheses they would like to test. Professor Hameed, for example, sought to address the research questions of why undergraduates look for health information for their parents and why they tend to go online to do so.

Research design encompasses these initial overarching choices, as well as a wide array of other decisions, including which method(s) to use to recruit participants for your study, what strategies to use to collect data from these participants, and what technique(s) to use for analyzing the data you have collected. Such decisions must flow from your research questions: You will want to select the methods that will yield the type(s) of data that will best enable you to answer your

research questions. For example, if your research question focuses on why people engage in certain information behaviors (as Professor Hameed's did), interviews will be a better choice than an online survey.

Ideally, research designs enable you to maximize both the validity and reliability of your findings. Validity refers to the degree to which you are accurately measuring what you're intending to measure. A common example of validity (or lack thereof) is the question of whether an IQ test actually measures an individual's level of intelligence. Reliability refers to the degree to which you will get the same results if you repeatedly conduct a measurement under the same conditions. For example, if you step on a reliable scale today and learn that you weigh 140 pounds, your weight should be reasonably similar tomorrow, particularly if you step on the scale under similar conditions (e.g., when you first wake up, wearing only your pajamas, and holding nothing in your hands). Although an ideal research design would enable you to maximize both validity and reliability, researchers often find that there is a trade-off. For example, if you want to measure the usefulness of a public library to members of a particular community, you could simply look at their visitor log and see that 325,000 people had visited the library last year. Although this measure is reliable, it is likely not valid, as you cannot assume that these individuals, simply by entering the library, found the library to be useful. In contrast, you could stand outside the library door and ask people exiting if you could interview them. Although this measure will very likely be valid, as you can ask in-depth questions about their perceptions regarding whether or not the library is useful to them, it likely is not replicable. You will only be able to interview so many people. Moreover, if you interview 10 people today and then go back tomorrow to interview another 10 people, you may reach quite different findings across the two days.

It is important to keep in mind that there is no such thing as a perfect research design. All research designs, and the many choices that go into them, involve trade-offs. Recognizing that all study designs have both strengths and weaknesses, researchers try to maximize these strengths while minimizing the weaknesses as much

as possible. One strategy that researchers frequently use to strengthen their study design is called “triangulation.” Triangulation involves using multiple methods, drawing on the strengths of one method to help to compensate for the weaknesses of another. When done well, triangulation tends to yield findings that are more accurate, more comprehensive, and richer (that is, more detailed and more contextual). Returning to our example of trying to measure the perceived usefulness of a public library for its community members, you might conduct a two-stage study. First, interview twenty people to learn about their perceptions regarding the usefulness of the library (to enhance the validity of your study design). And then, armed with this information, you can use it to build an online survey that can be administered to a much larger number of people (to enhance the reliability of your study design).

## THE RESEARCH PROCESS

Researchers generally follow a series of steps when conducting their investigations. The general steps of the research process are shown in [Table 8.1](#). Please keep in mind that this is a very oversimplified picture of the research process – it is very rarely this linear and the steps are seldom this discrete and clear-cut! The various steps often overlap (for example, researchers frequently collect and analyze data simultaneously), and researchers frequently find a need to return to earlier steps in the course of their studies (for example, when analyzing their data, a researcher may find that their research questions need to be tweaked so they can report their most interesting and potentially impactful findings). Think about a design process in which technologies are iteratively designed, prototyped, evaluated, and improved until they are found to be both fully usable by and useful to the target users and, thus, ready for production. In a similar manner, researchers frequently iterate between designing their studies, recruiting participants, conducting data collection processes, analyzing the data they collect, and reporting their results.

**Table 8.1. Steps of the Research Process (oversimplified!)**

<b>Stage</b>	<b>Step</b>	<b>Example</b>
I. Research Design	1. Identify a novel and important research problem	Although there are now vaccines available for many serious childhood diseases, including measles, mumps, and rubella (MMR), a sizable proportion of parents in the United States are not having their children immunized because they believe that such immunizations cause autism.
I. Research Design (continued)	2. Conduct a literature review to see what relevant investigations have already been carried out by other researchers	Although there are some studies that have looked at the information behaviors of anti-vaxxers, very few have investigated the original sources of their beliefs that vaccines cause autism and their credibility assessment processes when encountering related information online.
I. Research Design (continued)	3. Decide on the particular research question(s) (RQ) you would like to investigate (or, if applicable, state the specific hypotheses that you would like to test)	RQ1: What are the source(s) of anti-vaxxers' beliefs that vaccinations cause autism? RQ2: When encountering information online that pertains to the safety and desirability of vaccinating one's children, how do anti-vaxxers go about assessing the credibility of this information? RQ3: Why do anti-vaxxers ultimately decide against vaccinating their children?
I. Research Design (continued)	4. Determine the aims and goals for your research	I am aiming to understand (1) which sources anti-vaxxers rely on and (2) whether and how they assess the credibility of these sources when deciding not to vaccinate their children. My overarching goal is to identify potential sources of misinformation that are proliferating on the Internet and to come up with a strategy to combat all of this misinformation.
I. Research Design (continued)	5. Identify your population of interest and select a strategy (or strategies) that will enable you to recruit people from	My population of interest is adult Internet users who reside in the United States and who have opted not to vaccinate their children due to their belief that vaccines cause autism. I believe I can best reach this population by placing a link to a

	this population for your study	survey within a public online forum where most of the people who post fit my recruitment criteria.
I. Research Design (continued)	6. Select the data collection method(s) that will best enable you to answer your research questions	For RQ1, I'll conduct an online survey to learn about the sources of anti-vaxxers' beliefs that vaccines cause autism. In the last question on my survey, I'll ask participants to provide me with their email address if they are willing to participate in a follow-up interview over the phone or Skype. These interviews will best enable me to answer RQ2 and RQ3, as they are much more in-depth "how" and "why" questions.
I. Research Design (continued)	7. Select the technique(s) that you will use to analyze your data	For RQ1, I'll primarily perform quantitative data analysis using SPSS; however, I will also have some data from open-ended questions that I'll need to analyze more qualitatively. For RQ2 and RQ3, I will use NVivo to conduct qualitative data analysis.
II. Implementation	8. Recruit your participants	With the permission of the moderator of a relevant forum and with approval from my university's IRB, I posted a link to my online survey.
II. Implementation (continued)	9. Engage in data collection process(es)	After posting the link, a total of 65 people completed my online survey; 18 (28 percent) of these individuals agreed to and completed an interview with me. With interviewee permission, I created audio-recordings of each interview session.
II. Implementation (continued)	10. Analyze your data	Using SPSS, I analyzed all of the data from my online survey. Also, I imported my interview transcripts into NVivo and conducted qualitative data analysis.
II. Implementation (continued)	11. Identify your findings	I identified many interesting patterns as a result of my data analysis. I found that ... (Here you will answer your RQs.)
III. Write-Up or Presentation (for more	12. Share your study, whether through a journal article,	Begin your paper/presentation with an introduction to your research, a summary of your review of the

detailed information on this stage, see <a href="#">Chapter 7</a>	conference paper, conference presentation, etc.	relevant literature, and a recap of the methods you used to recruit your participants, collect data from them, analyze your data, and identify your findings.
III. Write-Up or Presentation (continued)	13. Discuss your findings and their implications	What did you find out? What are the answers to your research questions? Why are your findings important? What do your findings tell us? What actions can we (not necessarily you – maybe search engine designers, health educators, etc.) take to help improve this situation?
III. Write-Up or Presentation (continued)	14. Point out both the contributions and the limitations of your study	e.g., My study is the first look into the ways in which anti-vaxxers form their beliefs about the dangers of vaccination; however, my findings cannot be generalized to all anti-vaxxers in the United States as my study includes only people who participate in one specific online forum, and I interviewed just 18 people.
III. Write-Up or Presentation (continued)	15. Identify ideas for future research	e.g., Based on my study, I found that social media sites are a major source of misinformation about the safety of vaccinations. In a future study, I will focus on information-sharing activities in online forums in order to further investigate this particular finding.

## RESEARCH METHODS

In this section, we will look at the many types of methods-related options that are available to researchers as they consider their selection of recruitment strategies, data collection methods, and data analysis techniques.

### Recruitment Strategies

Although researchers often have a number of different strategies available to recruit participants for their studies, recruitment often turns out to be one of the most difficult steps in the research process.

This is especially true when dealing with a very specific population and/or one that is notoriously difficult to reach. For example, if you're trying to reach people with scleroderma, this will likely prove quite difficult because this is an incredibly rare disease. Similarly, if you're trying to find people who do not have Internet access from their home, it may be relatively difficult. Not only is this an increasingly rare population, but it will be harder to get in touch with them as you'll need to use nonelectronic forms of communication.

After a researcher has identified a population of interest, they need to reach out to members of this population to invite them to participate in their study. Because it is nearly always impossible to obtain the participation of an entire population, researchers often work with just a *sample* of their target population. The sample is the subset of the population that has agreed to participate in the study. Ideally, this subset (or sample) is completely randomly chosen and representative of the entire population; however, this is seldom actually the case. As mentioned with regard to research design, there are trade-offs involved here as well. A random sample may increase the validity and/or broader applicability of the study's findings, but the time and effort required to pull together this sample may be prohibitive. And so a researcher may opt instead to use a sample that is much easier to reach. For example, a researcher may wish to interview adults who have type 2 diabetes about their self-management behaviors. She posts a flyer in a local diabetes clinic, asking potential participants to call her if they would be willing to talk about their diabetes management efforts. Most likely, the people who contact her will be doing better, on average, with their diabetes management because they're attending a clinic and are willing to speak with a stranger about this quite personal topic. The resulting sample will not be random and will certainly not be representative of the entire population of adults who have type 2 diabetes.

So how do researchers secure the participation of a sample of their population? One quick and informal way is "convenience sampling." In convenience sampling, the researcher reaches out to members of their selected population who are easily accessible to

them. For example, I may have five friends who have type 2 diabetes and decide to simply ask them to participate in an interview. An extension of this type of sampling is called “snowball sampling.” In snowball sampling, study participants are asked to share the invitation to participate in the study with other folks who fit the inclusion criteria (i.e., adults over the age of eighteen who have type 2 diabetes). For example, my five friends might ask their friends to contact me if they would be willing to be interviewed as well.

More formal recruitment strategies, which will likely result in more representative samples, entail reaching out beyond the researcher’s own contacts (and the contacts of their contacts). For example, posting a flyer about a study in a local diabetes clinic (as mentioned earlier), posting a survey link to a relevant online forum (as mentioned earlier), and/or recruiting at local support group meetings attended by members of your population (with permission of the group’s leader) would enable you to reach out beyond your own social circles and beyond the social circles of those in your social circle. The use of “gatekeepers” is another way to gain access to members of a particular population; for example, you might ask your doctor to hand out flyers about your study to all of her patients who have type 2 diabetes.

## Data Collection Methods

Information behavior researchers employ one or more of a wide variety of methods when collecting data from their study participants. In this section, we’ll look at many of the data collection methods that have been used by information behavior researchers, including observation, interviews, focus groups, questionnaires, diaries, experiments, and ethnographies. [Table 8.2](#) summarizes these methods, listing some of the advantages and disadvantages of each of them. In the paragraphs that follow, each of these data collection methods is discussed in further detail.

**Table 8.2. Data Collection Methods**

Data Collection Method	Advantages	Disadvantages
Observation	<ul style="list-style-type: none"> <li>Can find out objective information about people's actual behaviors</li> <li>Don't have to rely on people's memories/self-reports</li> </ul>	<ul style="list-style-type: none"> <li>Can be difficult to gain access to the population/site</li> <li>Subject to researcher's selective attention/remembering</li> <li>Building rapport/trust takes time</li> <li>Simply observing influences that which is being observed</li> <li>May encounter ethical dilemmas</li> <li>Cannot observe some very important factors, such as people's thoughts and feelings</li> </ul>
Interviews	<ul style="list-style-type: none"> <li>Can gather in-depth answers to more complicated questions</li> <li>Can ask open-ended questions and get rich, detailed data</li> <li>Flexible</li> <li>Ability to probe</li> <li>Ability to confirm your understanding and seek clarification</li> </ul>	<ul style="list-style-type: none"> <li>Rely on people's memories</li> <li>Rely on self-report</li> <li>Can be time-consuming</li> <li>Building rapport/trust takes time</li> <li>Interviewer may (inadvertently or not) influence interviewee's responses</li> </ul>
Focus Groups	<ul style="list-style-type: none"> <li>Interplay between participants can sometimes yield data that is otherwise unattainable</li> <li>Interplay between participants can show patterns</li> </ul>	<ul style="list-style-type: none"> <li>Requires a skilled, experienced moderator</li> <li>May be hard to keep participants focused on the topic at hand</li> <li>May be difficult to remain in control of the session</li> <li>Some respondents may drown out others</li> </ul>

Questionnaires	<ul style="list-style-type: none"> <li>• Can be relatively low cost</li> <li>• Can include a larger sample</li> <li>• Can reach some hard-to-reach populations</li> <li>• Can guarantee anonymity and confidentiality for the respondents</li> <li>• Can design the questionnaire in a way that will streamline subsequent data analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Data is self-reported, which may lead to errors or omissions (either intentionally or unintentionally)</li> <li>• May be difficult to get people to agree to participate <i>and</i> to actually finish the survey; this can lead to self-selection bias (do the people who were willing to complete the questionnaire differ in some important way from those who were not willing to do so?)</li> <li>• Difficult to foresee and prevent all possible misunderstandings that may arise when respondents work their way through the questionnaire and answer each individual question; poorly worded questions can lead to measurement error (that is, problems with validity – what you were intending to measure with a particular question may not be what you're actually measuring if respondents misunderstood your question)</li> <li>• Limited ability to probe respondent answers (unless an interviewer is administering the survey)</li> </ul>
Online Questionnaires (additional considerations specific to online questionnaires, in particular)	<ul style="list-style-type: none"> <li>• Often easier and less expensive to conduct</li> <li>• Tend to be faster and easier for participants to respond to, resulting in lower response times</li> </ul>	<ul style="list-style-type: none"> <li>• Tend to be quite impersonal</li> <li>• Can be very difficult to recruit participants, which can lead to low response rates</li> <li>• There is frequently self-selection bias – the people who respond likely differ along important lines from those who do not</li> <li>• Unless prevented from doing so, respondents may submit multiple responses</li> <li>• Respondents may give up midway through a survey if the survey seems too complex</li> </ul>
Diaries	<ul style="list-style-type: none"> <li>• Can gather a large volume of data from participants</li> <li>• Can gather data without the researcher needing to be present</li> <li>• Participants may be more</li> </ul>	<ul style="list-style-type: none"> <li>• Participating in a diary study may feel artificial</li> <li>• Reliance on participant self-report is problematic if people are unable or unwilling to share their true thoughts, feelings, or stories</li> <li>• Participants may misreport, either purposefully or due to memory limitations</li> <li>• Participants may change their actual behaviors simply because they know they will have to report them</li> </ul>

	willing to share personal information via this method	<ul style="list-style-type: none"> <li>• Diaries can pose great difficulties when it comes to data analysis, particularly if they are completely unstructured</li> </ul>
Experiments	<p>Lab:</p> <ul style="list-style-type: none"> <li>• Can test a particular hypothesis</li> <li>• Better able to control for any potential alternative explanations</li> </ul> <p>Field:</p> <ul style="list-style-type: none"> <li>• Can test a particular hypothesis</li> <li>• Setting is more realistic</li> </ul>	<p>Lab:</p> <ul style="list-style-type: none"> <li>• Imposes an artificial environment</li> <li>• Any findings reached may not apply outside of the lab</li> </ul> <p>Field:</p> <ul style="list-style-type: none"> <li>• Researcher has far less control over the situation</li> <li>• Researcher may reduce realism by imposing particular procedural requirements on subjects</li> <li>• Findings may actually be due to some alternative explanation</li> </ul>
Ethnographies	<ul style="list-style-type: none"> <li>• Can result in a very rich, “insider” view of the selected population’s everyday lives, including their behaviors, perceptions, and social interactions</li> </ul>	<ul style="list-style-type: none"> <li>• Can be difficult to gain entry to, and secure permission from, the population of interest</li> <li>• Tend to be very time-intensive to conduct, frequently extending over long periods of time</li> </ul>

## *Observation*

Information behavior researchers commonly conduct observation, particularly if they are most interested in people’s *actual* behaviors. Self-report methods, such as questionnaires and interviews, often result in data that tells the researcher about what people say they do, which may or may not match what they actually do. For example, one study (Covell, Uman, & Manning, 1985) used both a questionnaire and observation (triangulation!) to learn about physicians’ information

needs in the course of their medical practice and the sources they turn to in order to fulfill these needs. The study found that, although physicians reported turning to more formal sources such as textbooks and journals, observation of their actual information seeking revealed that they far more frequently turned to a colleague or another health professional when they had an information need.

Researchers who conduct observation position themselves along a continuum, ranging from completely hands-off (nonparticipant observation) to actively engaged in the situation that they are observing (participant observation). If you would like to conduct observation, be sure to first obtain permission from the people/setting you would like to observe. Even if you're conducting your observation in a public place, it can be a good idea to secure permission (as applicable). Also, decide in advance whether or not you'll be a participant and how long you will observe for, and prepare an observation guide in which you list exactly what you will be observing for. When you conduct your observation, you will want to adhere to your observation guide and your selected role. Additionally, you'll want to record the session (with permission) and take some notes both during and directly following the session, as well.

Observation comes with both advantages and disadvantages. Advantages include the ability to obtain objective information about people's actual behaviors and to get around the need to rely on people's memories and what they're willing to report to you. Observation comes with some serious challenges, however. For example, you may have difficulty securing permission to conduct your observation, and even if you do secure permission, it will likely take a considerable amount of time to develop rapport and trust with the folks you're observing. In addition, you will need to rely on your memory and the limited amount of attention you have to distribute across everything that is occurring simultaneously in the setting. You may also encounter some ethical dilemmas. For example, you may be observing children's play-related behaviors and notice that one of the children is about to engage in some potentially risky type of behavior. You will need to quickly make the call as to whether to simply observe the child's behavior and record it or intervene. Another

disadvantage of observation is that the very fact that you are observing them may lead them to change their behaviors. For example, although you would like to get an accurate picture of how people actually behave, they may behave in more socially desirable ways simply because they know they are being observed. One additional major limitation of observation is that many types of factors cannot be observed. For example, you cannot discern a person's thoughts and feelings simply by observing them and their behaviors. To overcome this limitation, researchers quite commonly add a think-aloud component to their studies. Here, researchers observe one participant at a time and ask them to continuously "think aloud" as they're being observed engaging in an activity, explaining their reasoning behind each of their actions.

### *Interviews*

Another method that information behavior researchers commonly use to collect data from their participants is interviews. Through interviews, you can learn a lot about a person's feelings, thoughts, and/or experiences. Researchers who conduct interviews may choose to do a structured interview, in which they simply follow a preprepared script (often called an "interview protocol") asking a fixed set of questions. Alternatively, they may opt to do an unstructured interview, which leaves them completely free to ask whatever questions may come to mind. Between these two ends of a continuum, researchers can go with a semi-structured interview. Like structured interviews, there is a preprepared script with a fixed set of questions; however, like unstructured interviews, the researcher is free to follow up on people's answers to questions (through a process called "probing") and/or to ask any other questions that may come to their mind.

Pohjanen and Kortelainen (2016), for example, conducted semi-structured interviews with twelve transgendered participants in order to investigate their gender-identity-oriented information needs, the sources they consult for this information, the barriers they have encountered in trying to find this information, and their related

information-sharing processes. These researchers found that, as transgender individuals face a wide range of barriers in seeking information (including psychological, interpersonal, demographic, environmental, and source-related barriers), other transgender people were the most important source of information for them.

Interviews have a range of advantages, as well as some important disadvantages. On the positive side, interviews enable researchers to ask open-ended questions, get in-depth answers to their questions, and collect very rich, detailed data. Interviewing is a very flexible data collection method because it permits interviewers to probe interviewees' answers, checking that they have understood them correctly and asking for further information and/or clarification, as needed. Interviewing has some weaknesses as well, however. Researchers are forced to rely on interviewees' memories and are dependent upon their willingness to reveal the truth, the whole truth, and nothing but the truth. In addition, interviews take considerable time to conduct, and researchers may have a difficult time building rapport with interviewees and gaining their trust. Also, as with observation, an interviewer may inadvertently (or not) influence an interviewee's responses (such as by nodding enthusiastically or frowning when the interviewee gives a certain response).

### *Focus Groups*

Focus groups, which are basically group interviews with approximately six to ten participants, are generally conducted by a moderator. The job of the moderator is to keep the conversation going while making sure that everyone is given the opportunity to voice their thoughts and opinions and that participants remain focused on the topic of interest. Bernhardt and Felter (2004) conducted focus groups with twenty mothers of young children to find out where they go online when they need health information and why they choose these particular sites. These researchers found that their participants preferred to get clinical health information online provided by clinicians, but preferred to get parenting advice from other parents online. They also found that participants were concerned about the

trustworthiness of the websites they visited, particularly those that were selling products.

The advantages and disadvantages of focus groups are similar to those for interviews. However, focus groups have some additional advantages and disadvantages that arise from the group setting. One of the major advantages of focus groups is that the interactions between group members may reveal more information than one-on-one interviews. For example, focus group participants may build upon one another's comments, leading to findings that would not have been possible had you interviewed everyone independently of one another. In addition, there are times when study participants may be more comfortable sharing information in a group setting as compared to one-on-one with an interviewer. Focus groups have important disadvantages as well. To be effective, moderators often need to have specific expertise and extensive experience conducting focus groups, as it can be quite difficult to keep participants on topic and to remain in control of the session. Additionally, focus group sessions can be dominated by one or two participants who may effectively prevent others from fully participating. However, moderators who have a great deal of experience frequently can successfully alter this dynamic and secure the engagement of the quieter participants.

### *Questionnaires*

Questionnaires are very commonly used as a data collection method in studies investigating people's information behavior. With this method, a predetermined list of questions is presented to participants, whether on paper, via the telephone, online, or even in person. Questionnaires may include various types of questions:

- Closed-ended questions have limited response options (that is, possible answers) for the respondent to choose from, as in "Please rate your level of agreement with each of the following statements using the scale provided, where -3 = completely disagree and +3 = completely agree."

- Open-ended questions place no specific requirements on the respondent (e.g., How do you feel about the current president of the United States?).
- Mixed questions provide respondents with some fixed response options but also allow for respondents to fill in their own open-ended answer (e.g., “What is your favorite color?  Red  Green  Blue  Yellow  Other: \_\_\_\_\_).

Questionnaires have a wide range of advantages, including a lower cost (in general), a potential to reach a larger and more diverse sample (including some populations that can be hard to reach), the ability to guarantee that you'll protect respondents' anonymity and confidentiality, and the opportunity to design the questionnaire in such a way that it will facilitate your subsequent data analysis processes. On the other hand, questionnaires have important limitations. As with interviews, questionnaires are self-reported, and respondents may be unable or unwilling to answer your questions accurately and comprehensively. In addition, people may not be willing to start or finish your questionnaire, particularly if it seems too complex. Moreover, they may not understand your questions and/or response options in the same way that you meant them – a problem that is amplified by the fact that there is usually no way to probe or to follow up on respondents' answers.

Increasingly, researchers are conducting questionnaires online, whether via email, a website, or social media platform. Although online questionnaires are often easier and less expensive to conduct, faster and easier for participants to respond to, and result in lower response times, their impersonal nature can make it very difficult to secure and sustain people's participation through to completion. In addition, there is frequently self-selection bias: The people who respond to an online survey likely differ in important ways from those who do not. For example, people who do not use the Internet will not complete a survey online. And, people who feel strongly about the subject of the survey – either positively or negatively – are more likely to respond than people who have no interest in the subject. In

addition, unless safeguards are taken, respondents may submit multiple responses.

Rowley, Johnson, and Sbaffi (2017) conducted an online survey in order to learn about the various factors that influence men's and women's trustworthiness judgments as they look for health information online. Based on the 471 completed questionnaires submitted, representing a response rate of just under 24 percent, Rowley et al. found that both men and women based their trust judgments on credibility, recommendations from family and friends, ease of use, and brand, but women also consider style while men also consider their familiarity with a site. Rowley and colleagues also found that men tended to be more focused on how comprehensive and accurate the information is, how easy it is to access the information, and how familiar it is, while women tended to be more focused on cognitive factors, such as how easy it was to read and understand the information.

### *Diaries*

Although relatively less common, some information behavior researchers have asked their study participants to keep a diary. Diaries may be completely unstructured, as when a researcher may ask participants to jot down their thoughts and mood at the end of each day. Alternatively, they may be completely structured and resemble a questionnaire. For example, a researcher may provide each participant with a structured form that contains closed-ended questions and a limited set of response options for each of them. In between these two extremes, researchers may ask participants to fill in a diary form that includes both closed-ended and open-ended questions.

Some advantages of diaries as a research method are that researchers can gather a great deal of information from participants, and they do not need to be present to obtain this data. Additionally, participants may feel more comfortable sharing their personal thoughts via a diary, particularly without a researcher present at the time. However, imposed diaries may feel artificial and diary studies

are completely reliant on participant self-report – people may or may not share their actual thoughts, feelings, or stories with you. They may misreport to purposefully mislead you or simply due to memory limitations. In addition, people may change their behaviors during the period when they are participating in a diary study. For example, someone who is participating in a diary study about their dietary choices may make choices they otherwise would not, such as selecting healthier foods so they can avoid having to report their less healthy choices. An additional limitation of diaries as a data collection method is that the resulting data can be quite difficult and time-consuming to analyze, particularly if the researcher chooses to use a completely unstructured format.

Researchers conducting a diary study may choose to use a technique called “experience sampling” in an effort to overcome the potential problems of artificiality and memory limitations that can plague diary studies. The Experience Sampling Method (ESM) involves contacting respondents at various time throughout the day (or week, etc.) to request that they make an entry in their diary. In one such study (Rieh, Kim, Yang, & St. Jean, 2010), researchers emailed study participants (adult residents of Michigan who use the Internet every day for at least one hour for purposes other than or in addition to email) several times per day in order to find out about the online activities in which they were currently engaged and about any activities they were conducting in order to assess the credibility of the information they were finding online. Based on a total of 2,471 diary entries received from 333 different respondents, Rieh et al. found that participants’ credibility assessments were most frequently based on their perceptions of the accuracy, currency, reliability, trustworthiness, and truthfulness of the website they used. Surprisingly, participants rated author/creator expertise and authoritativeness as less important factors in their credibility assessments of online information.

### *Experiments*

Experiments are less commonly used in information behavior research, largely due to their failure to take into account people’s

actual real-life contexts and their tendency to involve the imposition of at least a partially artificial context on subjects for the purposes of data collection. Conducting an experiment enables researchers to test a particular hypothesis they have in mind, such as “When middle school students are under time pressure, they’ll satisfice when completing their homework for school.” In order to accurately draw conclusions about the causal nature of this relationship (i.e., being under time pressure *causes* these students to satisfice), however, researchers need to control for all other possible explanations (often called “rival explanations”) of the subjects’ satisficing behavior. For example, it’s possible that middle school students may satisfice when it comes to their homework due to a lack of motivation. If you do not control for this rival explanation, you will be unable to confidently conclude that it is definitely the state of being under time pressure that *caused* the students to satisfice.

Experiments can be conducted in either a lab or in the “field.” In a lab experiment, researchers invite subjects into a lab to participate in their study. Conducting the study in a laboratory environment helps to control for any alternative explanations; however, it also creates an artificial environment. As a result, any findings that result from a lab experiment may not apply beyond the lab. For example, although you may find that when you invite students to your lab, set the scenario that they’re under time pressure, and then observe that they satisfice, you cannot be sure that they would do so if they were at home or at school (both of which are much more natural places for them to be working on their schoolwork).

Field experiments, in contrast, are run in some real-world setting, and the researcher may either simply observe what occurs when some external event occurs or administer some type of external treatment and then observe the results. For example, a researcher might observe how a particular population’s tweets changed when a terrorist attack – an external event – occurred in their city. Field experiments offer more realism; however, they offer researchers far less control. Additionally, a researcher may impose some procedures on subjects that reduce the realism, and their findings may actually be

due to some alternative explanation. For example, although the researcher may find that people's tweets became more numerous and pessimistic in tone following the terrorist attack, they cannot be sure that the terrorist attack is what caused these changes. Perhaps something else happened around the same time, such as the local government laying off many employees.

In early 2012, data scientists at Facebook conducted an experiment on their platform, unbeknownst to their users (Hill, 2014). For one week, they manipulated the News Feeds of 689,003 Facebook users in order to see how removing all positive posts (or all negative posts) affected users' moods. These researchers found that, when they removed all positive posts from a user's News Feed, the user made a larger number of negative posts and a smaller number of positive posts. Similarly, when they removed all negative posts from a user's News Feed, the user made a larger number of positive posts and a smaller number of negative posts. The researchers concluded: "These results indicate that emotions expressed by others on Facebook influence our own emotions, constituting experimental evidence for massive-scale contagion via social networks" (Kramer, Guillory, & Hancock, 2014, p. 8788).

This experiment angered many Facebook users when they learned about it more than two years later. Many felt that they had not given their informed consent to participate in this experiment. However, Facebook researchers pointed to the Facebook Data Use Policy, which all users must agree to when creating their Facebook account, as evidence that users' informed consent was secured. The policy states that information posted by users on the site will be used "for internal operations, including troubleshooting, data analysis, testing, **research**, and service improvement" (Hill, 2014). Although two of the coauthors of the paper reporting this experiment were associated with Cornell University at the time (one as a faculty member and one as a graduate student), Cornell's IRB stated that this project did not fall under their purview, as the experiment was conducted by Facebook (Verma, 2014).

## *Ethnography*

Although relatively rare in information behavior research, some researchers conduct ethnographies. A researcher conducting an ethnography will completely immerse themselves in their selected population's everyday life context, frequently over an extended period of time. Thus, ethnography is sometimes referred to as "deep hanging out." The goal of conducting an ethnography is to learn about the population's behaviors, perceptions, and/or social interactions. Ethnographers frequently use multiple data collection methods, including observation, interviews, and focus groups. They may also examine documentary products produced and/or used by the population. Although ethnographies have the advantage that they can result in a very rich, "insider" picture of the selected population's everyday lives, including their behaviors, perceptions, and social interactions, they can be quite challenging to conduct. Researchers must seek permission from their target population, and it can be very difficult to gain entry, particularly to some populations. Additionally, ethnographies are often conducted over long periods of time.

A senior researcher with Intel Architecture Lab's People and Practices Research Group, Genevieve Bell (2001), reported an ethnographic study conducted by Intel researchers over a 16-week period in 1999, visiting 45 households and 15 urban centers in Italy, the United Kingdom, Germany, France, and Spain. Using participant observation, interviews, and photo inventories of people's households, these researchers investigated the ways in which technologies were embedded in households and the broader community, and how people made use of them. The goal for their study was to inform technology design and development at Intel. Bell explains that the goals of Intel's People and Practices Research include "understanding people and their daily practices with an eye to finding new users and new uses for technology" (p. 2). Ethnography in this sense is sometimes referred to as "design ethnography."

Bell (2001) and her colleagues found that people were both using a wide range of media and producing their own content. They also found that people spend a great deal of their time outside their homes

and that third places (that is, places other than home or work) are often where people not only socialize, but also consume and produce various types of media content and make use of technologies. Bell writes that their findings suggest that there are opportunities for new products, such as ones that support computing in public spaces. In conclusion, Bell points to the rapid growth of pervasive computing at the time, writing that we need to keep in mind that “the ‘home’ might not be the starting point or the center of the brave new digital world” (p. 9).

## **Data Analysis Techniques**

Researchers select from various techniques in order to analyze the data they have collected. Frequently, they will begin data analysis before data collection has been completed, as this gives them a chance to adapt their data collection processes if needed to obtain data that will help to address their research questions. For example, a researcher may find, upon analyzing the data they have collected so far, that their participants are not diverse enough in some respect (e.g., many more females than males have participated) or that one of their interview questions is poorly worded and needs to be better clarified for future participants.

The nature of the data to be collected drives the researcher’s selection of data analysis technique(s). For example, researchers will likely want to use statistical analysis processes if they have gathered quantitative data. Similarly, they will likely want to use qualitative data analysis techniques if they are conducting interviews that are resulting in transcripts that are largely textual in nature. In this section, we’ll look at the various types of techniques information behavior researchers use to analyze their data. In the first two subsections, we’ll look at general quantitative data analysis techniques and qualitative data analysis techniques, respectively. In the remaining sections, we’ll describe some specific data analytic techniques that researchers use to analyze data that has been externally generated, rather than gathered by the researchers themselves, including content

analysis, discourse analysis, citation analysis, secondary data analysis, meta-analysis, log analysis, and social network analysis.

### *Quantitative Data Analysis*

Researchers who collect numeric data from their study participants often perform quantitative data analysis; that is, they conduct statistical analysis. There are two types of statistical analyses – descriptive and inferential. Researchers may perform one or both of these types of analysis. Descriptive statistics include various ways of describing the sample that participated in the study. These include both measures of central tendency and measures of dispersion. Measures of central tendency include the mean, median, and mode. For example, a researcher might calculate the average age (mean) of their participants, the age at which one-half of their participants are less than this age and one-half are greater than this age (the median), and the most common age among their participants (the mode). Measures of dispersion include the range, variance, and standard deviation. Continuing our example, the researcher may calculate that their participants ranged in age from nineteen to ninety-two (so the range equals seventy-three). They may also calculate how spread out the ages of the participants are (the variance). The bigger the variance, the more spread out the ages are. They might also calculate the standard deviation, which is simply the square root of the variance.

Some additional types of descriptive statistics include frequency distributions, which show the counts of participants per each particular category (e.g., 10 participants rated their ability to create a Web page as “1” Novice, 15 said they were “4” Average, and the remaining 5 said they were “7” Expert) and cross-tabs, which show the distribution of participants at the intersection of two (or more) different variables (e.g., On average, participants ages 18 through 24 rated their ability to create a Web page as 4.07, whereas the mean rating of participants ages 65+ was 1.41).

Researchers may also calculate inferential statistics to test whether or not they can make inferences about the entire population,

rather than report findings that just pertain to the much smaller sample of people who actually participated in their study. Some of the more common inferential statistics include:

- Pearson's correlation coefficient: a measure of the strength of the relationship between two variables;
- t-tests: a test to compare two means to see if there is a statistically significant difference;
- ANOVA: a test to compare three or more means to see if there is a statistically significant difference;
- Chi-square test of independence: a test to determine whether or not there is a statistically significant relationship between two categorical variables, such as age bracket and self-rated ability to create Web pages, and
- Regression analysis: a procedure for investigating the relationship between a dependent (or outcome) variable, such as one's rating of one's ability to create Web pages, and one or more independent (or predictor) variables, such as participant age and the average number of hours they spend on the Internet per day.

Researchers conducting quantitative analyses frequently prepare various types of visualizations to help them communicate the results of their statistical analyses. For example, they may prepare a pie chart to show the distribution of their participants by age bracket. They may also prepare various types of bar charts that help them to share their findings. If they have done some regression analysis, you may see that they have included a scatterplot to depict the results of their regression analysis.

### *Qualitative Data Analysis*

Researchers who gather qualitative data through data collection methods such as interviews and/or focus groups will generally conduct qualitative data analysis. Interviews and focus groups are frequently audio-recorded, and the recordings are then transcribed

(that is, the contents of the recordings are typed) into software such as Microsoft Word. The resulting transcripts are then imported into some type of qualitative data analysis software, such as NVivo (<https://www.qsrinternational.com/nvivo/home>) or ATLAS.ti (<https://atlasti.com>). Once the transcripts are imported, this type of software supports the researcher as they seek to identify the major themes present in the data and to label each snippet of text with the relevant code(s).

Qualitative data analysis is a lot like tagging – the researcher can use themes from the literature review that they conducted when designing their study and/or they can identify novel themes that they can discern based on patterns that appear across their own set of transcripts. While the former type of coding is referred to as deductive or top-down (checking for previously identified themes), the latter is referred to as inductive or bottom-up (seeking to identify the themes that arise out of one's data). Though the evidence that results from quantitative data analysis is usually in the form of statistics and perhaps visualizations, such as figures and charts, the evidence that results from qualitative data analysis tends to be in the form of verbatim quotes from participants. When reporting the results of qualitative data analysis, researchers make extensive use of participant quotes to provide support using participants' own voices for each of the themes that they've identified in their data.

### *Content Analysis*

Some information behavior researchers analyze the contents of documents, such as letters, newspapers, books, journal articles, speeches, or songs. These researchers may focus solely on the actual words said or they may also try to read between the lines to identify any latent content. For example, they may analyze the contents of a series of letters between two individuals, paying attention to both what the letter explicitly states ("manifest content") and trying to infer content that seems to be implied ("latent content"). Content analysis may be carried out quantitatively or qualitatively. An example of the former is when the researcher analyzing these letters

sets out to count the number of times they mention a particular topic. An example of the latter is when the researcher tries to identify all of the different types of information shared or requested throughout the entire series of letters.

Information behavior researcher Heidi Julien and her coauthors performed a series of content analyses of the information behavior literature (Julien, 1996; Julien & Duggan, 2000; Julien, Pecoskie, & Reed, 2011; Julien & O'Brien, 2014). Drawing on journal articles reporting information behavior research studies, these authors identified a range of variables about this literature, including author occupation, research method(s) used, journal type, and user group(s) studied. In their most recent content analysis of the information behavior research literature, Julien and O'Brien (2014) found that interviewing was the most commonly used research method among information behavior researchers during the 2009–2013 period. Interestingly, all three of their earlier studies that covered the periods 1990–1994, 1984–1989, 1995–1998, and 1999–2008, respectively, had identified that information behavior researchers were much more likely to administer questionnaires rather than conduct interviews. Note that this longitudinal series of content analyses revealed an important trend in information behavior research – interviews were gaining in popularity, while questionnaires were falling out of favor among information behavior researchers.

### *Discourse Analysis*

Discourse analysis involves analyzing conversations that take place between people. Some information behavior researchers focus particularly on information requests and information sharing that may take place in people's conversations with one another. For example, to learn more about the information-seeking activities of pregnant women during prenatal visits with their midwife, one researcher (McKenzie, 2004) analyzed the conversations that occurred during these visits. McKenzie found that the pregnant woman (the patient), the midwife, and other participants present during the encounter (such as the patient's partner) positioned themselves and one

another. For example, the patient may position herself as needing information and her midwife as being an expert who can provide the needed information. This positioning influenced what information needs the patients were willing to share and what types of information the midwife was willing (or not willing) to offer. Researchers who conduct discourse analysis draw heavily on participant verbatim quotes when sharing their findings. For example, McKenzie (2004) provides numerous extended snippets from the conversations that she analyzed.

### *Citation Analysis*

Citation analysis involves analyzing a body of literature with the goal of identifying patterns in the citations. Such patterns can reveal the other researchers, or even disciplines, that influence a particular researcher's work. At a higher level, they can also provide a picture of the development of a particular field over time. Use of citation analysis within information behavior research, though still not commonplace, has increased dramatically over the past decade. For example, Julien and O'Brien's (2014) content analysis of the information behavior literature from 1999–2008 included an element of citation analysis. By looking at the works cited by information behavior researchers, Julien and O'Brien were able to discern how interdisciplinary the information behavior literature is, as well as the specific disciplines from which information behavior researchers were drawing in their work. In this way, they found that 35 percent of all citations in the information behavior literature were to works outside of the Library and Information Science field. Additionally, they identified that specific external intellectual influences on information behavior research come from the fields of Social Science, Science, Computing, Health, Humanities, and Business (in order from most to least influence).

### *Secondary Data Analysis*

Secondary data analysis involves using an externally generated data set for one's own research. One benefit of secondary data analysis is that the researcher does not need to collect the data themselves before beginning their analysis. With this method, however, the researcher has no say in what questions were asked of respondents, how they were worded, what response options were provided to them, or how the questions and response options were ordered. Thus, the researcher is limited with regard to what research questions they can answer and what types of analyses they are able to carry out using the data.

St. Jean, Jindal, and Liao (2017) conducted a secondary analysis using the National Cancer Institute's (NCI) Health Information National Trends Survey (HINTS) data set. NCI has been conducting this survey since 2003 in order to learn about US adults' cancer-related perceptions and knowledge; their health behaviors; and their health-related information access, needs, seeking, and use. St. Jean et al. investigated the following research questions: (1) How prevalent is information avoidance (as measured by a survey question that asked respondents to rate how much they agree or disagree with the statement, "I'd rather not know my chance of getting cancer") among the US adult population? and (2) What types of demographic, information-seeking, cognitive/perceptual, and social factors are associated with information avoidance? The researchers' overarching goal was to identify potential interrelationships among the concepts of information avoidance, health literacy, and health justice. St. Jean et al. found that nearly one-third of the survey respondents either strongly or somewhat agreed with the statement "I'd rather not know my chance of getting cancer." They further found that agreement with this statement was much more prevalent among older (particularly those ages 75+) respondents, as well as those who were less well-educated; had lower household incomes; were unemployed, disabled, or retired; did not have health-care coverage; did not use the Internet; and were less confident in their ability to take good care of their health and to get advice or information about cancer if they needed it.

## *Meta-Analysis*

Although uncommon in information behavior research, some researchers have conducted a meta-analysis, which entails gathering together multiple research studies that have investigated similar research questions and collected comparable data in order to identify any overarching patterns that hold true across the studies. The major benefit of meta-analysis is that any findings that result will be more likely to generalize beyond the specific populations studied, as they are based on a larger (and often more diverse) set of subjects. However, meta-analyses can be quite difficult to conduct, as studies are frequently incomparable due to having different research questions, using different instruments, and/or reporting their findings in different (and perhaps insufficiently detailed) ways. One example of a meta-analysis is Ankem's (2006) meta-analysis of 12 studies conducted between 1993 and 2003 that had explored the information sources used by cancer patients. Ankem found that cancer patients most commonly turned to health care professionals, medical pamphlets, and family and friends when they needed information. Additionally, this population felt that information from books, health-care professionals, and medical pamphlets was the most helpful.

## *Log Analysis*

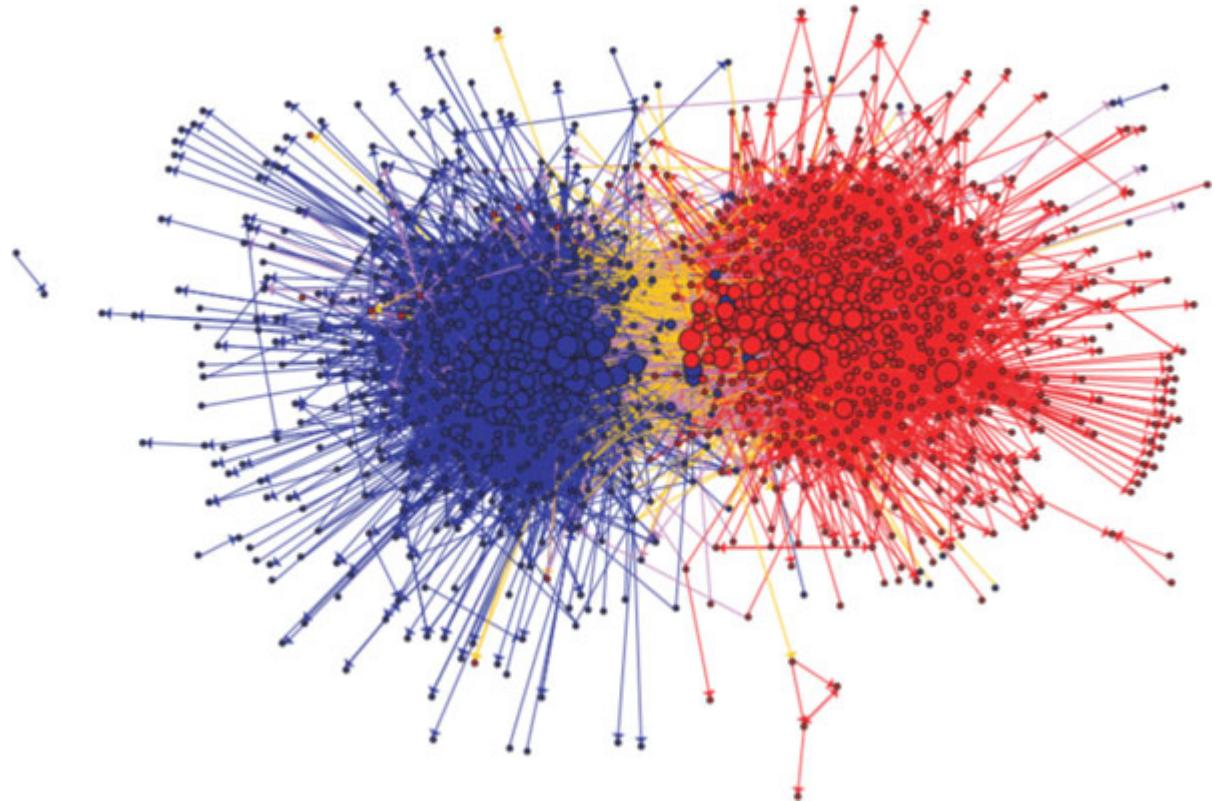
Log analysis (sometimes referred to as “transaction log analysis”) entails analyzing logs of users’ online activities, such as the queries they have posed to a search engine. Through log analysis, a researcher can gather information about users’ actual behaviors, rather than being limited to what users say they did or say they would do under particular circumstances. On the other hand, however, log analysis will not provide a researcher with any information beyond the user’s activities themselves – there is often no information about the user’s situation and their reasons for engaging in particular behaviors, unless the researchers use additional data collection methods in combination with transaction log analysis. An example of a research study that employed log analysis is Liu and Jansen’s (2012) analysis

of 10,000 “information seeking tweets” (i.e., tweets in which Twitter users were seeking answers to a specific question they posed) posted during the period of October 13–20, 2011. The authors found that 30 percent of these tweets pertained to “Human Interest” or “Entertainment Culture” topics. They also found that information-seeking tweets were less likely to be directed at particular user(s); less likely to contain temporal expressions (e.g., “today” and “what time”); and more likely to contain location identifiers, such as the names of specific travel destinations.

### *Social Network Analysis*

Social network analysis involves analyzing the components, as well as the relationships between the components, in a social network. Most commonly, the components are individuals and the relationships are connecting factors, such as whether or not individuals know one another, whether (and to what extent) the individuals communicate with one another, and whether (and to what extent) the individuals share information with one another. A very early social network analysis (Granovetter, 1973) found that people are far more likely to acquire information that is novel (to them) from their weak ties (that is, from acquaintances) rather than from their strong ties (their family members and friends).

A more recent social network analysis (Adamic & Glance, 2005) examined the linking patterns between political blogs during the two months preceding the 2004 US presidential election. Adamic and Glance found that conservative blogs were much more likely to link to other conservative blogs, and that liberal blogs were much more likely to link to other liberal blogs. Of the two types, conservative blogs linked to one another more frequently and exhibited a denser linking pattern (see [Figure 8.1](#)).



**Figure 8.1** Network Analysis of the Political Blogosphere (Adamic & Glance, 2005)

## IMPLICATIONS OF RESEARCH DESIGNS

Why do researchers' choices matter as they hammer out their research designs? Most fundamentally, these choices profoundly shape what a researcher can possibly learn from their investigation. For example, Professors Hutchinson's and Hameed's decision to focus their studies on undergraduate students means that they will learn nothing about young people who seek health information for their parents but who are not undergraduate students at their particular university. Similarly, Professor Hutchinson's sole use of an online survey will limit her ability to learn more contextualized information, such as why students look for health information for their parents and how they go about doing so. Professor Hameed's sole use of interviews will limit his ability to generalize his findings beyond the group of fifteen students he interviewed.

Researchers' choices regarding their data analytic techniques also matter. For example, consider the impact of Professor Hameed beginning the analysis of his interview transcripts with preexisting assumptions about why students look for health information for their parents. If he proceeds to conduct his analysis guided solely by these assumptions and is not open to new reasons that may emerge from his data, this will ultimately limit what he can learn from his interviewees. Both Professor Hutchinson and Professor Hameed could strengthen their research designs by employing triangulation, that is, by incorporating multiple types of data collection and/or data analysis techniques into their investigations. It is important to keep in mind that, because every decision that goes into designing a research project can have significant impacts, researchers must carefully weigh the potential consequences of each of these decisions for the validity and reliability of their findings.

## **ETHICS IN RESEARCH**

One of the most crucially important aspects of research design is ethical considerations. Most academic/research institutions (including colleges and universities) have an institutional review board (IRB) that oversees all of the research carried out by members of the institution. Before a researcher can begin any study, they must seek and secure approval from their institution's IRB. When conducting social science research (which includes information behavior research), researchers elicit the participation of human subjects. The overarching goal of the IRB is to ensure the protection of the rights and welfare of all research participants.

Most fundamentally, research participants must not be harmed or deceived; their participation must be informed and voluntary; and their data should be anonymized or, at the very least, kept completely confidential. Perhaps you've heard about the medical experiments that Nazi researchers carried out on prisoners of war during World War II and/or the actions of US Public Health Service researchers during the 1932–1972 Tuskegee Syphilis study. The latter involved experiments conducted across time on 400 rural African-American

men living in poverty. These men were recruited because they were suffering from syphilis, and the researchers wanted to see how the disease would progress. Although a cure for syphilis (penicillin) was identified partway through the study (in 1943), treatment was withheld from these men because the researchers wanted to be able to continue to observe the progression of the disease. In addition, alternative procedures (such as spinal taps) were administered to these men under the guise that they were cures for syphilis. The National Research Act of 1974, which required universities to establish IRBs to monitor researchers' compliance with these ethical standards, was a response to these transgressions.

The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, which was created under the 1974 National Research Act, was asked to prepare a list of the fundamental ethical principles to which human subjects researchers must adhere. In 1979, the commission published "The Belmont Report," outlining three fundamental ethical principles:

1. **Respect for Persons** requires that participation be both informed and voluntary. Researchers must provide sufficient information about their studies to potential participants so they are fully informed about what they are consenting to, and they cannot require that anyone participate;
2. **Beneficence** calls for researchers to do right by their participants, refraining from doing any harm to them, and, ideally, creating benefits for them; and
3. **Justice** requires that researchers fairly distribute both the burdens and benefits of research. For example, a research study should not be conducted on one group for the sole benefit of another group.

When conducting social science research, the golden rule applies – do not do to anyone anything you would not want done to you. At all times, keep your participants' well-being in mind. Respect them, be honest with them, respect their autonomy, and, above all, protect them (and their data) from any potential harm. With much research

data collection moving online, new types of ethical questions are arising. For example, is it ethical for researchers to scrape posts from an online forum, analyze them, and then publish the results? Can researchers ethically use posts in a public online forum without contacting the user who posted them to obtain their informed consent? There are mixed views on this issue. On the one hand, these users have already willingly shared their information in a public forum online. On the other hand, though, they did not do so with the intention or understanding that researchers would gather their posts and use them for their research.

When designing a study, one of the fundamental questions a researcher must ask is: Does the potential value of any findings from my study outweigh any possible costs and/or risks I am imposing on my participants? If the answer is “no,” the researcher must go back and reconsider the design of their study, adjusting it until they can, with complete confidence, answer this question in the affirmative.

## DISCUSSION QUESTIONS

- Have you ever participated in a research study, whether as an interviewee, a survey respondent, a subject in an experiment, or anything else?
- Have you ever conducted (or assisted with conducting) a research study that aimed to generate some new knowledge?
- Have there been any interesting research investigations reported in the news recently? For example, see: “Anti-vaxxers trolled a doctor’s office. Here’s what scientists learned from the attack” ([https://www.washingtonpost.com/health/2019/03/21/anti-vaxxers-trolled-doctors-office-heres-what-scientists-learned-attack/?utm\\_term=.770a7678c9b8](https://www.washingtonpost.com/health/2019/03/21/anti-vaxxers-trolled-doctors-office-heres-what-scientists-learned-attack/?utm_term=.770a7678c9b8)), but pick something more recent and that personally interests you! Locate the original study that yielded the findings reported in the article. There should be a link you can click from the news article. Take a look at the methods the researchers used to recruit participants for their study, to collect data from them, and to analyze this data.

What strengths and weaknesses can you identify in their research design? Does the news article accurately and comprehensively report the study's findings? Do you buy the researchers' findings? Why or why not?

- What do you think about the Facebook experiment mentioned in this chapter? Do you feel that, in signing up for a Facebook account and agreeing to their Data Use Policy, users are providing their informed consent to any research that Facebook would like to conduct on them (and/or using their data) at any time? Why or why not?
- How do you feel about user posts in a public online forum? Are they fair game for researchers? Or should researchers have to secure users' informed consent before collecting and using their posts for their research?
- Drawing on some personal interest of yours, propose a research study into the information behaviors of some particular population: (1) What research question(s) would you like to investigate? (2) What are your aims and goals for your research? (3) Who is your population of interest? (4) How might you go about recruiting a sample of individuals from this population? (5) What data collection method(s) would you use? Why? (6) How would you go about analyzing your data? and (7) How might you share what you learned?
- Thinking about the information science career you're planning to pursue, do you think that you will likely engage in human subjects research? If so, who might be your population(s) of interest? How will you reach out to them? How will you collect data from them and analyze this data? What might you do with your findings? What types of ethical considerations will you need to keep in mind?

**Learning Activity:** Reread the opening paragraphs about Professor Hutchinson's and Professor Hameed's research investigations. For each of these studies (1) Identify at least three strengths and three weaknesses of their research design; (2) Discuss whether or not you

would trust their findings and why or why not; and (3) Suggest one or two ways in which their research design could be strengthened.

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# 9

## *Assessing User Information-Related Preferences and Information Needs*

Mimi Nguyen, a recent graduate of Midburg College who majored in information science, now works as a software designer. For her most recent project, she designed an app for older adults to keep track of their medicines and their doctor appointments. Before beginning to work on designing the app, she conducted some formative analyses (i.e., analyses conducted before beginning to design the app) with other employees at her company to see what they would like the app to do, how they would like it to look, and what types of interactions would seem intuitive to them. Her co-workers ranged in age from twenty-three to sixty-eight, with most of them being in their twenties and thirties. After drawing on this information to design the app and build a prototype, she paid ten people who fit the actual audience profile – people ages sixty-five and older who need to keep track of their medicines and their various doctor appointments – to come to her office, try out the app, and let her know their thoughts. When they arrived, Mimi found that only three of them had actually ever used an app, although nine of the ten owned a smartphone. She also learned

that her co-workers' preferences regarding the features and appearance of the app, as well as the particular types of interactions they found to be intuitive, did not hold for her target population. She decided to scrap her work thus far and converted the session to a formative analysis so she could return to the drawing board and design something (perhaps not even an app?) that was a much better match for the needs and preferences of her intended audience.

Bryan Settles, a recent graduate of the library science program at Millerville University, just started a job as an assistant reference librarian at the local public library. On his third day on the job, a young mother approached him and asked him for books about cranes. Bryan directed her to the section of the adult floor of the library that had books on animals. After about ten minutes, the young woman returned to Bryan, saying that she was looking for books about construction equipment for her five-year-old son. Bryan apologized and showed her to the children's section of the library, where she asked the children's librarian to assist her further.

Maya Gracia, a recent graduate of the master in information management (MIM) program at the State University of Vermont, recently began a job working as a data analyst for a large video game development company. Her supervisor asked her to do some data mining to identify their past customers who would most likely be interested in a new MMORPG (massively multiplayer online role-playing game) currently under development. Maya's supervisor instructed her to limit her analysis to just male customers, assuming that the vast majority of MMORPG players are men. Maya conducted the analysis and identified a list of 3,200 male customers who would likely be interested in the new game; however, she did not agree with her supervisor's call to just focus on male customers, thereby leaving out the company's large proportion of female customers. So she went home that night and did some additional research online. She found that about 40 percent of MMORPG players are women and that women tend to be more interested than men in playing role-playing games. The next day, Maya repeated her analysis using her company's customer database, limiting it to just female customers, and identified an additional 4,100 customers who would likely be

interested in the company's new game. When Maya let her supervisor know about these results later that afternoon, her supervisor thanked her profusely for going beyond what she had explicitly asked Maya to do. When the game was just about ready to go on the market a few months later, the company's marketing team emailed a flyer about the game's upcoming release to the more than 7,000 customers that Maya had identified. The game turned out to be tremendously popular, and more than half of the purchasers were women.

\* \* \*

All three of these stories demonstrate how crucially important it is to assess the information-related preferences and needs of your target audience, right from the very beginning. In the first story, Mimi (a new software designer) initially turned to a conveniently accessible population (her co-workers, who skewed relatively young), rather than the population for whom she was truly designing her app (older adults). As a result, the app she designed was not a good fit with her intended users' information-related preferences and needs. Although she had already done extensive work on her app before speaking directly with her intended users, she was forced to return to the drawing board, even questioning whether an app was actually the best fit for her intended audience. In the second story, Bryan (a new assistant reference librarian at the local public library) made assumptions about the patron's information need. Because he did not ask the patron for more information about her information need, including who the information was actually for, he sent her to the wrong section of the library. In the final story, Maya (a recently hired data analyst employed by a video game development company) responds to her supervisor's stated information need but also goes a step further, realizing that a truly comprehensive answer to the supervisor's question would require a broader analysis of the company's entire customer database. Maya's willingness to go beyond her supervisor's stated need greatly increased the company's marketing and sales of the new game.

Across these three stories, we see that a crucial first step in helping someone with their information needs entails interacting directly with them. Rather than making assumptions about your users/patrons' information-related preferences and needs, it's important to work with them to identify their true information need and, at times, perhaps go beyond their stated need. As we have mentioned, people may not know their true information need and/or they may be unable to articulate it. After all, if someone is asking for information about a topic, it's likely due to their limited knowledge on this topic. If an individual's knowledge is limited, they will also likely have a limited ability to conceive of and articulate the questions that are most likely to lead them to the information they truly need.

In this chapter, we will discuss the importance of assessing people's information-related preferences and their information needs before you jump in to "help" them with these needs. In addition, we'll look at some of the processes that information professionals use to conduct such assessments. Many types of information professionals work with, or on behalf of, people in order to fulfill their information needs. Public librarians, for example, develop physical and electronic collections that will be of use to their local communities. They also design programs and services that will help fulfill community members' information needs. In addition, they respond to many reference questions each day, whether posed in person, on the phone, via email, or by text. Similarly, user requirements analysts frequently work closely with both end users and system designers/software developers, aiming to bridge the gap between these two populations so that the resulting product will fit the users' preferences and successfully meet their needs. In all of these cases, a full understanding of the information-related preferences and the information needs of your specific user population will be necessary before you can effectively and comprehensively fulfill their needs.

We will begin this chapter by recapping our earlier discussion (from [Chapter 2](#) defining and characterizing information needs. Next, we will look at some of the major guidelines that govern reference librarians' work, including Taylor's Five Filters of Question Negotiation, Dervin and Dewdney's (1986) Neutral Questioning, the American Library

Association (ALA) Reference and User Services Association's (RUSA's) (2013) Guidelines for Behavioral Performance of Reference and Information Service Providers, and Kuhlthau's (2004) Zones of Intervention. In the third section of this chapter, we will look at some of the related techniques employed by system designers and software developers engaged in an analogous process, often termed "user requirements analysis." In our final section of the chapter, we will look at some of the methods one might use in order to subsequently evaluate whether and to what extent an individual's (or a company's or community's) information needs have been accurately identified and successfully fulfilled, along with the outcomes and longer-term impacts that have (or have not) resulted.

## **DEFINING AND CHARACTERIZING INFORMATION NEEDS**

In [Chapter 2](#), we introduced the concept of information need, pointing out that information needs frequently (though not always) drive an individual to look for information. We also emphasized that people who have an information need may or may not be aware of that need (that is, they may be experiencing incognizance), and they may or may not seek information to fulfill that need (they might actually try to avoid any information that could possibly relate to this need). We also pointed out that people who do not have a particular information need in mind may seek information simply out of curiosity or just for fun. In addition, we introduced the term "serendipity," which describes the process of someone who just happens upon information that is useful to them. Such chance encounters may enable someone to identify (or perhaps even fulfill) an existing information need that they had been previously unable to recognize, accept, articulate, and/or act upon.

Many different types of contextual factors form important dimensions to an individual's information need, including the specific situation in which their need arose, their preexisting knowledge on the topic, the reason(s) they need this information, and the purposes for which they are hoping to use this information. Information needs are

frequently ongoing and tend to evolve, changing across time as the individual's situation (both their actual and their perceived situation), knowledge, attitudes, motivations, and/or preferences change.

As described in [Chapter 2](#), Taylor (1968) identified “four levels of information need,” basically a set of stages through which library patrons tend to move with regard to an information need. An individual first experiences a visceral need; that is, they have just a vague sense that they’re missing some important information. Next, the individual has a conscious need; they are now able to describe their information need, but their description is ambiguous and rambling. Third, the person reaches a formalized need; they now are able to describe their need much more clearly and, as a result, a librarian (or other type of information professional) is usually much better able to assist them. At the final level, the individual may compromise their information need; that is, they may try to describe their information need in the way that they believe will best enable the librarian to help them. This is frequently an unhelpful step, as the individual may actually end up obscuring their true information need. Taylor describes an important process called “question negotiation,” in which a librarian works with a patron to go from this compromised information need back to the individual’s conscious or formalized need so they can more accurately identify their true information need and better assist them.

Taylor’s levels of information need are crucially important to user information needs assessment. Information professionals can glean important cues by listening carefully to the user and asking “good” questions (that is, questions that are open-ended and neutral – more on this later), trying to determine the level of the information need that the user has presented to them and working with the user to identify their true information need.

In sum, information needs are messy, both for the individual holding the need and for the individuals who are aiming to assist them with their needs. Individuals may be incognizant, remaining unaware of an information need; they may not understand their information needs; and they may not be able to articulate them. They also may be unable or unwilling to act on them. Additionally, information needs are

influenced by a very large and diverse array of contextual factors, and these factors (as well as the individual's information needs themselves) are frequently moving targets. So with all this messiness, how can we best go about assessing people's information needs and helping to fulfill these needs? Next, we turn to the world of reference librarianship for some guidance on this important question.

## **GUIDELINES FOR REFERENCE LIBRARIANS**

In this section, we'll take a look at some of the major guidelines that have been developed to guide reference librarians as they work with patrons to identify and fulfill their information needs. Keep in mind that these guidelines, though designed with librarians in mind, are applicable to any information professional who is trying to learn more about what their users want and need. We'll begin with Taylor's (1968) five filters of question negotiation, and then move on to Dervin and Dewdney's neutral questioning and the American Library Association (ALA) Reference & User Services Association (RUSA) (2013) Guidelines for Behavioral Performance of Reference and Information Service Providers. Finally, we'll look at Kuhlthau's (2004) Zones of Intervention.

### **Taylor's Five Filters of Question Negotiation**

As mentioned earlier in [Chapter 2](#), Taylor (1968) emphasized both the importance and the complexity of the reference interaction, describing the question negotiation process as "how one person tries to find out what another person wants to know, when the latter cannot describe his need precisely" (p. 179). In addition to identifying four levels of information need, Taylor also identified five filters through which an inquirer's question passes as a librarian or information specialist works with them to identify and fulfill their information need. These filters include:

1. the subject or topic of the person's inquiry;
2. the person's motivations and goals for seeking information;

3. personal characteristics of the user, such as their background, their library experience, and their preexisting knowledge on the topic of their question;
4. how the user's described information need relates to how resources relevant to the inquirer's question can be best located and accessed; and
5. the types of answers that are anticipated by and acceptable to the user.

Taylor emphasizes that, although the filters tend to occur in this order as the conversation between a librarian and a patron unfolds, the order may vary and information relevant to more than one of the filters may be gathered simultaneously through just one statement made by the user.

Although the first of these filters (the subject/topic of the user's question) is likely quite obvious to you, the others are frequently ignored, resulting in users who walk away without their information needs being accurately identified and/or fulfilled. An information professional who fails to find out why a user needs information and/or what they're hoping to use the information for (as in the earlier story about Bryan) is likely limiting their ability to actually be of help to the user. Similarly, if an information professional does not take the time to find out about the user's preexisting knowledge on a topic, they may provide the user with either information that the user already knows or information that the user is unable to understand and make use of. The final filter – the types of answers that are anticipated by and acceptable to the user – is also incredibly important. For example, you likely wouldn't want to supply a link to a cancer survivor's blog for an 80-year-old who has recently been diagnosed with cancer and who is looking for trustworthy medical information about the prognosis of liver cancer. Such information is likely neither what she had anticipated nor something that she would find acceptable, at least given her current information need. As information professionals, we need to be sure to learn enough about each user, their information need, and their situation (including their goal[s] for the needed information) that we can provide (or lead them to) information that

aligns well with their preferences (such as being available in their preferred media type [e.g., online]). Only if we take the time to learn about our users can we be confident that we are providing them with information that will work for them, i.e., information they perceive to be conveniently accessible, relevant, comprehensible, trustworthy, well-timed, right-sized, useful, and actionable.

## **Dervin and Dewdney's Neutral Questioning**

Based on Dervin's (2003) work on sense-making, Dervin and Dewdney (1986) developed the strategy of neutral questioning for librarians working with users to identify and assist them with their true information needs. The goal of this user-oriented technique is for the information professional to understand the query from the inquirer's point of view. Central to this strategy is the use of open-ended questions that allow a user to describe their information needs in their own words, rather than limiting them to a restricted set of response options. Neutral questions are open questions; however, not all open questions are neutral. Dervin and Dewdney provide an example to illustrate this difference. A user poses the initial question "Do you have anything which gives more details about large corporations?" (p. 510). In responding the librarian may ask a closed (yes-or-no) question such as "Do you want annual reports?" or they may ask the user a more open-ended question such as "What sort of details do you want?" Alternatively, the librarian may ask open questions that are more neutral in nature; that is, ones that are broader than the user's statement of their information need, such as "What would you like to know about large corporations?" or "Tell me a bit about how you plan to use this information" (p. 510). Through neutral questions such as these latter two, the information professional gathers information from the user about the three central elements of the sense-making model: (1) the user's underlying situation; (2) the specific knowledge gaps the user is facing; and (3) the users' intended uses for the information.

Dervin and Dewdney (1986) emphasize that the use of neutral questions, particularly early on in the interview, is so important

because patrons' initial questions are rarely accurate reflections of their real information needs. Neutral questions can prevent the librarian from making assumptions about the user's need and better enable the librarian to effectively uncover the user's true need. However, the authors also point out that some situations and intents may call for other types of questions; for example, a librarian may use neutral questions early on in the interaction to uncover the user's information need and then use closed questions in order to verify their understanding. Dervin further points out that her work suggests that neutral questioning is more broadly applicable beyond librarianship, as "all professionals need to know what their clients really want and therefore all face the kinds of interviewing problems discussed in this article" (Dervin & Dewdney, 1986, 512).

### **American Library Association Reference and User Services Association (RUSA) (2013) Guidelines for Behavioral Performance of Reference and Information Service Providers**

RUSA identifies five different areas of librarian behaviors that are of central importance to the reference interview: (1) visibility/approachability, (2) interest, (3) listening/inquiring, (4) searching, and (5) follow-up. Although these guidelines were initially established for in-person reference interviews, the guidelines have been extended so they are also applicable to remote interactions, whether via phone, email, chat, text, or instant messaging.

The first guideline – visibility/approachability – refers to the importance of the librarian being present, visible, and available at the location (whether physical or virtual) where the user is likely to encounter an information need. For example, many libraries having roving librarians who circulate through the library, making themselves available to patrons as they browse the stacks and use the library's computers. One of the core components of this guideline is the need for the librarian to clearly be available and welcoming to patrons, as the librarians' behavior greatly influences the tone and the depth of the interaction. For an amusing (though a bit unsettling) example of an unwelcoming librarian, view this YouTube video by the Auckland City

Library, the “Not so good reference interview” ([www.youtube.com/watch?v=Niac-sIGd8g](https://www.youtube.com/watch?v=Niac-sIGd8g)).

The librarian in the “Not so good reference interview” video also violates the second guideline – interest. Librarians need to show an interest in the questions that patrons pose to them. Interest can be conveyed to the user not only verbally but also through physical behaviors, such as making eye contact, focusing your complete attention on the user, negotiating the user’s question with them, making sure you understand the user’s information need, and double-checking your understanding with the patron.

The third guideline – listening/inquiring – is arguably the most crucial one. Although the librarian in the “Not so good reference interview” does appear to listen, she definitely does not inquire (at all!). She simply makes assumptions and sends the patron to the wrong area of the library. When the patron returns to point out that she was sent to the wrong section, the librarian’s reaction is to blame the patron: “You didn’t say!” As a librarian (or any type of information professional), it is on you, not your user, to assess and fulfill their information needs. Users come to you precisely because they do *not* know. Active listening is a crucial component of this process. RUSA offers specific strategies related to this guideline, including letting the patron describe their information need first and then rephrasing their information need/question back to the user to make sure everyone is on the same page. Other important strategies include communicating in a friendly and helpful manner, avoiding jargon, using open-ended questions to find out more about the patron’s information need, asking questions to find out about the patron’s information-related goals and preferences, remaining objective, respecting the patron’s privacy, and maintaining the confidentiality of the interaction. When negotiating a user’s information need, you must keep in mind that their question(s) may not always accurately and adequately reflect their information need. Ideally, you want to fulfill the user’s actual information need, rather than just answer their stated question(s).

The fourth guideline – searching – calls for the librarian to find out what the user has already tried in their search for information and to

work with the user to develop, execute, and refine (as necessary) a search strategy that has been carefully crafted to lead to relevant results. It's important for the librarian to explain their search strategy to the patron and to work with them in sifting through the results to determine whether the results are useful. Together, the librarian and the user can work together to assess whether and how the search (as well as the choice of source to search) should be revised to retrieve more relevant results. This guideline also points out that the librarian may need to refer patrons to someone else (such as a subject librarian or a local museum) if they are unable to provide sufficient assistance.

The final guideline – follow-up – describes another crucially important step that librarians must take in order to successfully assess and fulfill a user's information need. As a reference interaction is winding down, it is important for the librarian to ask the patron if their questions have been completely answered and to invite the patron to return if they have any further questions. In this guideline, RUSA makes the very important point that the librarian needs to be careful to avoid prematurely ending the reference interview. Walking away or signing off an online chat before determining whether your user feels that their information need has been fulfilled, for example, can signal to them that you do not care whether your help helped. Failure to communicate your willingness to provide further assistance can make a user unlikely to return to you (or your library, company, agency, etc.) if they have another information need down the road.

## **Kuhlthau's Zones of Intervention**

In addition to knowing *how* to best work with a user to identify and fulfill their true information need, information professionals need to know *when* their offers of help will most likely be perceived by the user to be helpful. In her extensive research leading to the development of the Information Search Process (ISP) model (which shows that students' thoughts, actions, and feelings tend to proceed through a series of stages as they move from initiating their work on an assigned research paper to selecting a topic, exploring this topic,

choosing a focus within this topic, collecting relevant information, and presenting [or writing up] their completed project), Kuhlthau (2004) found that users perceived help to be more or less helpful depending on where they were in this process. She identified the concept of “zone of intervention” to indicate “that area in which an information user can do with advice and assistance what he or she cannot do alone or can do only with great difficulty” (p. 129).

Kuhlthau (2004) offers a series of strategies for information professionals to use in order to assess the user’s information need. Most importantly, the information professional will need to learn about the user’s context, including the nature and the requirements of their task, the user’s personal interests, the amount of time they have available to complete the task, and the types of information that are available to them (e.g., if a student has a paper due tomorrow, you likely would not recommend that they request a book that is only available via interlibrary loan). The information professional will also need to determine whether the user is facing a “source problem” or a “process problem.” Although a source problem relates to the user’s need for assistance with identifying and accessing relevant sources, a process problem is much more complex, as it relates to the user’s need for assistance with the research process itself.

Kuhlthau (2004) identified five different zones of intervention, each associated with a different suggested role for the information professional. The first four zones (Z1 through Z4) relate to users who have a source problem. In Zone 1, the user determines their own information need and obtains the needed sources themselves. In this zone, the information professional is largely just an organizer of potentially useful sources, as their earlier organization efforts will ideally support the user in locating helpful sources by themselves. In Zones 2–4, the information professional is more involved in assisting the user, but is still largely limited to roles that pertain to physical access – locating and identifying relevant sources and advising the user on issues relating to physical access:

- Zone 2: the user needs one “right” source and the information professional plays the role of “locator”;

- Zone 3: the user needs some relevant sources and the information professional plays the role of “identifier”); and
- Zone 4: the user is in need of a sequence of relevant sources and the information professional plays the role of “advisor.”

At the highest level – Zone 5 – an information professional plays the role of “counselor” in order to assist a user who has a process problem, communicating and collaborating with the user across time, assisting not only with challenges relating to physical access but also challenges relating to intellectual access.

When working with a user who has a process problem, Kuhlthau (2004) recommends that information professionals take steps to determine the user’s zone of intervention, taking into account factors such as the complexity of the user’s task, the user’s mood, and their degree of uncertainty. While Zones 1–4 focus on information sources and entail an information professional who assists the user in seeking information, Zone 5 focuses more on information use than on the information sources themselves and calls for the professional to help the user with the process of seeking *meaning*. By identifying the ideal zone(s) of intervention, the librarian who assists a user with a process problem (the “counselor”) can offer assistance to the user at the point(s) when their help is most likely to be perceived by the user as helpful. Kuhlthau points out that although most information professionals engage in source-related intervention (help fulfilling their information needs), a growing number of users are approaching librarians with problems that fall into Zone 5, thus needing librarians to take on this important counselor role and to provide process intervention (help with information-seeking and use processes) as well.

## **USER REQUIREMENTS ANALYSIS**

In a process akin to user information needs assessment within the library world, information systems and software designers frequently conduct a process called “user requirements analysis” in order to learn about the specific needs and requirements of their users. These

users may be internal co-workers, external clients (whether individuals or entire companies), or end users of a particular product. True user-centered design (that is, design that keeps the user and their needs at the center of the process throughout every stage) must begin with an in-depth analysis of the needs and preferences of one's intended users. Without the information that can be obtained through a careful analysis of user requirements, designers and developers can easily create a product that is not useful, not usable, and not appealing to their intended users.

Maguire and Bevan (2002) outline a four-stage process analysts use to identify and confirm user requirements in order to ensure the success of a system under design. Information gathering is the first stage. Here, an analyst identifies all users and stakeholders who may influence the system and/or be impacted by it. In a process called "stakeholder analysis," the analyst identifies for each user and for each group of stakeholders their roles, responsibilities, and task goals. The analyst also conducts secondary market research, reading research reports and drawing on census and other sources of demographic data in order to find out more about their target user population. In addition, the analyst learns in-depth about the context in which their system or product will be used. Such contextual data is crucial because a system or product designed for use in one context may be unusable in another. For example, a financial software package may work great for a company with 20 employees, but may be impossible (or much more difficult) to use for a company with 1,000 employees. The information-gathering phase also encompasses analyzing the specific tasks in which your users engage and the ways in which they approach these tasks. Analysts may draw upon a number of different data collection methods during this phase, including observation, interviewing, video recording, and asking users to maintain a diary of their activities throughout the day.

After collecting this data, the analyst begins the second phase of the user requirements analysis process – user needs identification. Analysts may use surveys, focus groups, and interviewing in order to elicit users' specific needs in regard to the system or product. In addition, they may also use scenarios and personas, developing

specific examples of uses and users of the system or product being designed. Scenarios and personas aid in the analysis of whether or not the system/product facilitates the user's completion of the tasks they need to accomplish. Analysts may also ask intended users about their long-term goals to try to elicit their needs. In addition, they may evaluate their own existing, or a competitor's, system to determine the extent to which it is effectively and efficiently meeting user needs and to identify any usability issues and specific improvements they might be able to build into their new system (Maguire & Bevan, 2002).

Drawing on the user requirements identified in the prior phase, the analyst then begins the third phase – envisioning and evaluation. In this phase, the analyst builds a prototype based on what they have learned about their intended users and their requirements. They then present the prototype to users (and sometimes designers, as well) in order to gather user feedback that will enable them to confirm and potentially refine the set of requirements they have identified. As with the other phases, analysts draw on a wide range of techniques. For example, they may conduct brainstorming sessions with design and task experts to identify potential solutions to users' needs. They may also conduct card-sorting exercises, asking users to sort a deck of cards labeled with some aspect of the system (such as system features or categories of information) into various piles. By analyzing the structure inherent in the users' distribution of the cards into the various piles, the analyst can discover ways to optimize the usefulness of their system for their users. At this point, designers are also likely to consult relevant design guidelines and standards (Maguire & Bevan, 2002).

In the final phase – requirements specification – the analyst documents the users' and any organizational requirements and specifies the function(s) that will be needed to support each of the tasks of each of the intended users. The analyst also ensures that there is a clear mapping among the specific functions of the system that are relevant to each user task. The analyst also identifies specific criteria that may be used later to evaluate whether the system has met the users' requirements. Although Maguire and

Bevan (2002) delineate these phases as a straightforward linear process, they emphasize that it is important to keep in mind that user requirements frequently evolve throughout this entire process. As a result, analysts may find it necessary to revisit earlier phases, looping back to information gathering, user needs identification, and envisioning and evaluating, as necessary.

In the following section, we'll shift forward in time to the period after a librarian has tried to assist a user with an information need or after a system designer has drawn on the results of the user requirements analysis to build a system or program and made it available to the intended users. How do librarians know whether their help actually helped – that is, how do they know how successful they were at accurately understanding a particular user's information need and assisting them with that need? Similarly, how does a system designer know how successful they were at designing a system or program that is truly user centered – one that meets the user's needs and is useful, usable, and appealing to them?

## **EVALUATING ONE'S SUCCESS AT IDENTIFYING AND FULFILLING USER INFORMATION NEEDS**

So you've done your very best to accurately assess and effectively fulfill your users' information needs. How might you go about determining how successful you were? One way you might measure your success as a librarian engaged in a reference interaction is to determine the accuracy of the information you provided to the user. However, simply measuring the accuracy of your response to a user's question will tell you nothing about whether the user's information need was actually fulfilled. The user may have been unable to convert their information needs into an answerable question and/or you may have misinterpreted what they were actually trying to ask. Simply assessing the accuracy of the information that was provided in response to a user question ignores the fact that accurate information may be of no use to the user for a whole host of reasons, such as whether they perceive it to be relevant to their information need,

whether it is incomprehensible to them, and/or whether it enables them to achieve the goal for which they were seeking information. Any comprehensive evaluation of success will need to involve the user; it is the user who has the information need, who understands their own context, and who is seeking the information for some particular purpose or goal. To obtain an accurate assessment of our success, we need to ask the user whether and to what extent they feel that they are any closer to being able to achieve their goal.

One measure of reference success proposed and utilized by Durrance (1995) is “willingness to return.” Willingness to return is assessed by asking a patron who has just posed a question to a librarian whether they would be willing to return to that same librarian to ask another question in the future. Though an earlier study (Hernon & McClure, 1986) had determined that librarians are successful about 55 percent of the time at accurately answering the questions patrons pose to them, Durrance (1995) found that more than 90 percent of patrons would be willing to return to a librarian if the librarian had seemed interested in their question, if they had good listening skills, if they identified the actual information need behind the user’s question(s), and/or if they used open-ended questions effectively.

Two major classes of assessment measures are outputs and outcomes. Outputs are generally quantitative in nature, helping you to answer questions such as “how many?” and “how much?” Outputs are frequently calculated statistically and expressed numerically using statements such as “75 percent of the residents in our county checked out at least one book from our library in the past year”; “995 patrons posed a reference question”; or “90% of our surveyed app users rated our app ‘excellent.’” Outputs are generally measured through methods such as record analysis (e.g., analysis of book circulation records within a library) and/or surveys.

Outcomes, in contrast, are frequently more qualitative in nature. When you’re trying to assess the outcomes of a program, service, or product, you’re interested in learning more about their impacts on your users and, perhaps more broadly, on your community or even beyond. Your goal is to find out what difference(s) you made in your users’ lives and perhaps in their family and/or community members’

lives, as well. The identification of outcomes usually requires methods such as structured observations, interviews, and/or focus groups.

If the goal of your assessment is to identify how much you achieved last year (without regard as to how your user was impacted), measuring outputs will be sufficient; however, if your goal is to assess your impact(s) on your users (and perhaps their family members and community members, as well) and to find out the specific differences that your resource, service, program, or product has made in their lives, you will need to go beyond outputs and focus on identifying outcomes. As a general rule, it is easier to measure outputs than outcomes. Although it is usually possible to identify one's desired and actual outputs, it is frequently impossible to foresee all of the potential outcomes and impacts that users may attribute to your resources, services, products, or programs. It's also important to keep in mind that outcomes are not always immediate, and so a comprehensive assessment of this kind can take months or even years.

Measuring outputs would tell you, for example, that 3,200,000 people bought your product last year. In contrast, assessing outcomes would yield information about whether and how your product impacted your customers' lives – what difference(s) did it make for them? Though the former reveals that your product is quite popular, the latter would help to reveal important information, such as *why* is it popular, in what ways it is effective, and potential areas for improvement. In a project funded by the Institute of Museum and Library Services (IMLS) called "How Libraries and Librarians Help: Context-Centered Methods for Evaluating Public Library Efforts at Bridging the Digital Divide and Building Community," Durrance and Fisher (2005) identified many types of outcomes experienced by library program participants, including more positive attitudes, improved ability to access information, greater feelings of self-esteem, increased knowledge and interest in learning, and making progress toward one of their goals.

Information systems and software designers use a wide array of techniques to assess whether their systems are meeting their user

needs. Most broadly, user experience (UX) encompasses a wide range of methods used to evaluate the user's experience along numerous dimensions, including usability, usefulness, and accessibility. The User Experience Honeycomb, developed by Peter Morville (2004), depicts seven such dimensions: (1) usable, (2) useful, (3) accessible, (4) desirable, (5) findable, (6) credible, and (7) valuable. Although each of these facets is important to consider during the design phase, they each also represent criteria for evaluation.

Usability – how easy users find a product or system to use – is a frequent target of assessment. However, usability is not just one dimension. It is made up of many factors, including:

- whether the design is intuitive to users;
- how easy it is for the user to learn how to use the interface;
- how quickly users can accomplish their tasks using the product;
- how memorable the users' interactions with the product are (that is, can the user remember how to use it when they return in the future?);
- how frequently users make errors, the severity of these errors, and how easy it is for users to recover from errors; and,
- the user's degree of satisfaction with the system ([usability.gov](#), 2019).

There is a vast range of methods used for assessing the usability of a product, including surveys, interviews, focus groups, card sorting, usability testing, and heuristic evaluation. In heuristic evaluation, human factors experts (that is, scientists who study how people interact with and use a product, such as an information system) assess an interface against an existing set of heuristics. For example, they may evaluate an interface using Nielsen's (1994) 10 Usability Heuristics, which include factors such as the degree to which the user can rely on recognition rather than recall to reduce the burden on their memory, the degree of match between the system and the real world, the availability and accessibility of help and documentation, the extent to which the user feels in control as they

use the system, and how successful the interface is at preventing user error and enabling users to recover from any errors that do occur. We will return to these topics of user experience and usability and cover them (and Nielsen's Usability Heuristics) in much more detail in [Chapter 11](#).

The importance of assessing a user's information needs both before and while assisting them (whether you're a librarian, a system designer, or some other type of information professional) cannot be overstated. Similarly, it is also important to follow up with users afterward to gauge how successful you were at accurately understanding and effectively assisting them with their information needs. By taking this extra step, you not only get another shot to be helpful to that particular user, but you can also learn new strategies that will make you even more helpful to future users.

## DISCUSSION QUESTIONS

- View the “Not so good reference interview” video ([www.youtube.com/watch?v=Niac-sIGd8g](http://www.youtube.com/watch?v=Niac-sIGd8g)). How effective was this librarian at assessing the patron’s information needs and helping to fulfill them? What did the librarian do well? What did she do poorly? If you were her supervisor, how would you help her to become a more effective librarian?
- Think back to some recent time when you had a need for information and you asked someone (whether a parent, a friend, a teacher, a librarian) for help with this need. What was the specific question that you posed? Did your question adequately describe your true and entire information need, right from the very beginning of the conversation? How did the person you asked for help respond? What did they do that was helpful for identifying and fulfilling your information need? Did they do anything that you found to be unhelpful? In the end, was your information need satisfied? If you have an information need in the future, how likely are you to consult this individual again? Why?

- Thinking about the information science career you're planning to pursue, how do you think the RUSA guidelines might apply?

**Learning Activity:** Reread the three stories at the beginning of this chapter and consider the following questions: (1) What are some of the advantages and disadvantages of relying on a convenience sample rather than your actual target user group, as Mimi did? (2) What are some of the potential pitfalls that a librarian (such as Bryan) and their patron can encounter when the librarian makes assumptions about the patron, their situation, their information-related preferences, and/or their information needs? (3) What are some of the advantages and disadvantages of a data analyst (such as Maya) performing exactly what they're asked to do and not going beyond the stated request? If you were Maya's supervisor in this scenario, how would you react to Maya's going beyond your specific request? What lessons might you learn about communicating future requests to Maya and perhaps other employees as well?

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# 10

## *Investigating User Information Behavior*

*Ricky Robles, an experienced website designer for Barks-n-Wags Dog Emporium (an online-only company that sells dog food and other types of supplies for dogs), conducted one-on-one observation sessions with ten dog owners ages thirty to sixty who regularly shop for products for their dogs online. After recruiting these individuals through his neighborhood online community, he went to each participant's home to watch them as they searched for pet supplies online. Based on his observations, he learned a great deal about their information-seeking strategies when shopping for products for their dogs online. For example, he learned that they nearly always began at a search engine (mostly Google) and were more apt to use keywords that related to the type of product they were looking for, rather than the name(s) of a particular brand. He also noted that they frequently clicked on the top search result (even though it was an ad) and that they were far more apt to click on search results that showed some type of customer rating. Drawing on his findings, Ricky recommended that his company look into advertising on Google. He also adjusted the product rating system on their*

*company website so that the overall review results would show up in the snippets provided in the Google search results list.*

*Sara Tam, the new manager of Monteek Public Library, emailed an online survey to patrons of the library to learn about how they look for materials when visiting the library in person. She learned that most people did not consult the online catalog, but instead roamed the library to see what they might happen to encounter. She also found that patrons in search of something specific tended to ask a reference librarian to help them to locate the item. As a result of what she learned, Sara decided to rearrange the library so that the most sought-out collections (popular fiction and personal finance- and health-related nonfiction) were right inside of the door as people walked into the building. She also moved the reference desk to a more central location, adding more signage to make it easier for patrons to quickly locate the desk if they wanted a librarian's assistance.*

*Professor Chau wanted to identify the factors that motivate or impede information seeking and use by older adults (ages sixty-five and up) who have been diagnosed with type 2 diabetes during the past year. To recruit participants, she placed a flyer in three local diabetes clinics, asking potential participants to call or email her. A total of thirty-five people signed up for the study. Professor Chau met each study participant at a location of their choosing (such as their own home, their local public library branch, or a nearby café or restaurant) and conducted a one-hour semistructured interview. Her questions focused most heavily on the period directly after the participant had received their type 2 diabetes diagnosis, delving into the reasons that they did or did not seek information, the specific information sources they turned to, and the reasons that they did or did not act on any information they found/encountered or were given. Drawing on her findings, Professor Chau published a paper describing her study and findings in a journal that is frequently read by consumer health librarians working in public libraries. Her goal was to help the librarians to optimize the resources, services, and*

*programs that they offer to their patrons, particularly to those who have been recently been diagnosed with type 2 diabetes.*

\* \* \*

People's information behavior (including their information needs, information-seeking strategies, and information use activities) within various types of contexts (e.g., school, work, leisure) can be investigated using many different methods, including observation (as Ricky did in the first story), surveys (as Sara did), and interviews (as Professor Chau did). The goal of this chapter is to increase your familiarity with, your understanding of, and your experience with critiquing studies of user information behavior. To achieve this goal, we will cover a sampling of ten information behavior investigations in this chapter, focusing first on two user groups whose information behavior has been frequently studied – students and workers. We'll then look at some examples of studies that have focused on user groups that have been less frequently studied by information behavior researchers: immigrants, hobbyists, voters, shoppers, and prisoners. In later chapters (Chapters 13 through 16), we'll cover the information behaviors of four additional populations much more in depth: (1) patients, (2) youth (children, tweens, and teens), (3) self-represented litigants (that is, people who represent themselves in court), and (4) library users.

## **STUDENTS**

Students are one of the most frequently studied user groups in investigations of people's information behavior. In this section, we'll look at two recent studies of college students' information behaviors. The first study (Brinkman, Gibson, & Presnell, 2013) investigated the academic and everyday life information-seeking behaviors of first-generation college students (that is, college students who are the first in their family to attend college). In the second study, Leeder (2019) investigated the information-seeking behaviors and critical evaluation

strategies of undergraduate students as they identified and assessed both real and fake news stories.

Brinkman, Gibson, and Presnell (2013) conducted focus groups with fifteen women and two men who self-identified as first-generation college students. Citing prior findings from the literature that first-generation college students are more likely to get lower grades, to have less confidence in their academic abilities, and to drop out of college, these authors sought to: (1) assess participants' perceptions regarding their college-related knowledge; (2) investigate their college-related information-seeking strategies; (3) explore any influences of participants' perceptions of their college-related knowledge and their ELIS (everyday life information seeking) strategies on their academic information-seeking behaviors; and (4) assess how participants used and perceived the university library in regard to both their academic and ELIS information seeking.

Brinkman et al.'s (2013) questions for the focus group were open-ended and focused on participants' decision to go to college, their preenrollment information-seeking behaviors, their general college experience, their experiences with ELIS, and their perceptions regarding research and the university library. At the end of each focus group, participants had the opportunity to offer additional comments and insights. The researchers audio- and video-recorded each focus group session and then used these recordings to produce a transcript of each session. Each researcher then independently conducted a qualitative analysis of each transcript to identify the central themes that emerged, and an external auditor checked their work and provided feedback. As a result of their analysis, the authors identified four main domains (financial issues, relationships with family, college support systems, and information seeking is overwhelming) and sixteen core themes.

Many of the participants in this study were from a lower socioeconomic background and reported encountering some struggles in adjusting to college life; however, they felt that their parents supported and encouraged them, and they believed themselves to be academically well-prepared for college (Brinkman et al., 2013). On campus, participants developed informal support and

information networks, as formal support systems provided by the university did not always effectively provide them with the information they needed. Participants preferred to find mentors with backgrounds similar to their own; for example, minority students mentioned that they found mentors in faculty and staff of color, and working-class students sought information and support from working-class university staff, such as cafeteria servers or bus drivers.

Brinkman et al. (2013) found that participants' academic and nonacademic information-seeking behaviors overlapped and that they were most frustrated with their lack of success in finding nonacademic information about college life. Participants felt that being a first-generation student disadvantaged them (relative to their peers) in this regard, as they described themselves as being "out of the loop" and their peers as having the "inside scoop" or knowing the "tricks of the trade." They felt information poor and like they were outsiders, because people from whom they sought information often expected them to have knowledge that they lacked. Participants also felt that, in comparison to high school (when they could simply consult their guidance counselor), the college-related information they needed was distributed across different divisions and offices on campus. Similar to findings from earlier studies, Brinkman et al. found that participants felt anxiety in the large, crowded, and unfamiliar university library and encountered difficulties finding the resources they needed there.

In conclusion, Brinkman et al. (2013) provide recommendations for university librarians working with first-generation college students, emphasizing the importance of avoiding library jargon, clarifying terms and directions, and being empathetic with the challenges this population faces in getting the information they need. They also suggest that libraries advocate for first-generation students' information needs across campus; ensure they have a diverse staff across many dimensions, including gender, ethnicity, socioeconomic background, and sexual orientation; and pursue opportunities to become mentors for these students, helping to reduce their anxiety around using libraries and connecting them with the various information resources distributed across campus.

In another investigation of the information behavior of students, Leeder (2019) conducted a survey of sixty-three undergraduate students to investigate how they identify, evaluate, and make decisions regarding whether or not to share both real and fake news stories. Citing earlier studies that found that college students are very likely to come across and share fake news online on social media platforms, Leeder sought to identify the information behaviors that relate to this population's ability to accurately determine the veracity and assess the quality of the new stories. In addition, he wanted to uncover the relationships between college students' evaluations of news stories and their decisions to share (or not share) them through social media platforms.

Leeder (2019) recruited seventy-two survey participants from undergraduate introductory courses in social informatics and in gender and technology at a US public university. The incentive offered to students for their participation in the survey was extra credit in their course. A total of 63 participants (50 [79 percent] males and 13 [21 percent] females; 24 [38 percent] Asian or Asian American students, 21 [33 percent] white students, 8 [13 percent] Latino/Latina students, 2 [3 percent] Black/African American students, and 8 [13 percent] students who selected "other" or "multiple races") completed the entire survey, which was hosted on Qualtrics. Participants spent 45 to 60 minutes completing the survey, which consisted of the administration of six fake news stories and six real news stories in random order. Participants were presented with a headline for each story and could then click on the URL provided to explore the story in greater depth. They were then asked to rate the trustworthiness and believability of each story and to describe how they made their evaluation. They were also asked whether or not they would be willing to share the story via social media if a friend had sent it to them. In addition, they were asked to indicate whether each story was "real" or "fake" and to describe their general habits around reading online news. After completing the survey, participants were asked to complete a questionnaire about their information-seeking behavior, particularly focusing on their behaviors when searching for and evaluating online information.

Leeder (2019) found that the study participants overwhelmingly rely on social media for their news – 89 percent of participants say they follow news on social media on a regular basis, compared to 44 percent who reported using national TV/cable news sites and 41 percent who reported using major newspaper sites. Approximately 40 percent of his participants' categorizations of news stories as real or fake were incorrect. Participants correctly categorized between four (33.3 percent) and twelve (100 percent) of the news stories, with the largest number of participants (25.4 percent) correctly identifying exactly half (six) of the stories. Just three (5 percent) of the participants correctly identified all twelve news stories as real or fake. Interestingly, participants' ratings of the believability and trustworthiness of news stories were highest for fake ones, while their ratings regarding their willingness to share stories over social media were highest for real ones. Of the five stories that received the highest believability and trustworthiness scores, four of them were fake. In contrast, of the five stories that received the highest "willingness to share" ratings, four of them were real.

Leeder (2019) further found that participants' willingness to share a story negatively correlated with the accuracy of their believability ratings (that is, participants were more likely to say they would share a news story if they had accurately assessed its believability) but not with the accuracy of their trustworthiness ratings (that is, participants' decisions as to whether or not they would be willing to share a news story were unrelated to the accuracy of their trustworthiness ratings). In other words, participants who correctly assessed the believability of a news story were more likely to be willing to share that story; however, participants who correctly assessed the trustworthiness of a story were no more likely (or unlikely) than other participants to say that they were willing to share the news story.

Overall, Leeder (2019) found a mismatch between participants' confidence in their critical evaluation abilities and their actual performance in evaluating the news stories provided. Unsurprisingly, Leeder found that participants who spent more time evaluating the news stories were more likely to evaluate them correctly. Similarly, participants who indicated on their postsurvey questionnaires that

they engage in critical evaluation behaviors when looking for information for their research assignments also performed better. For example, participants who performed much better at correctly identifying news stories that were fake shared the following behaviors. When looking for information for a research assignment, they generally examine entire Web pages when trying to judge the reliability of the information on the site and do not use the top result from the list of results. Participants who indicated that they use more than one source to get the information they need and that they scan through the results list were more accurate in judging believability and trustworthiness. Participants who indicated that they inspect the entire Web page when judging the reliability of information on a site were more accurate in just their trustworthiness ratings. In contrast, participants who indicated that they select information that matches with their own opinions were less accurate at judging the trustworthiness of the news stories and were more likely to indicate that they would be willing to share them with others on social media. This last finding suggests that people's beliefs and opinions regarding news stories, rather than their assessments of the actual accuracy of news stories, are more influential in their decisions regarding whether or not they're willing to share them.

Leeder (2019) asked participants how they came to their decisions regarding the believability and trustworthiness of each story. Participants (particularly those who were more accurate in their assessments of the news stories) described various verification strategies, such as using Google to look for other sources and going to fact-checking sites (such as [Snopes.com](https://www.snopes.com)) to double-check the story. Some of the participants who were less accurate in their assessments of the news stories reported that they had based their decisions on instinct or intuition; however, none of the participants who were more accurate in their assessments reported doing so.

In conclusion, Leeder (2019) draws on his findings to make specific recommendations about teaching critical evaluation skills to college students. Pointing to the mismatch between participants' self-ratings of their critical evaluation abilities and their actual performance in assessing the news stories presented to them in the study, Leeder

calls for instructing college students in explicit strategies they can use to evaluate the credibility of online information so they can more accurately evaluate their own performance. He also calls for information literacy instruction to encompass the successful information-seeking behaviors (i.e., looking at an entire Web page when evaluating how reliable the information on the site is, consulting multiple sources, scanning through the list of search results returned, and devoting sufficient time to finding and evaluating news stories online) and successful credibility verification strategies (i.e., verifying a news story by looking for other sources, conducting searches on Google to find out about a news story, and using fact-checking sites such as [Snopes.com](#)) used by his participants. He also encourages educators to explain why unsuccessful strategies, such as clicking on the top items on a search engine results page and simply going with information that matches one's own opinion, are not effective when trying to evaluate news stories on social media.

With regard to participants' willingness to share these news stories, Leeder (2019) emphasizes that he found no connection between this factor and the accuracy of participants' evaluations as to whether a story was fake or real and as to the believability and trustworthiness of the story. Instead, he found that participants' willingness to share news stories correlated with the reported behavior of selecting information that matches their own personal opinions. As a result, the author cautions that college students may not understand the potential societal ramifications of sharing fake or untrustworthy news stories on social media platforms. Educators should encourage their students to critically evaluate all online news (particularly news they find on social media) and to consider the possible societal consequences of their participation in the spread of misinformation online through their sharing of news stories they know to be fake or untrustworthy.

## WORKERS

People's information behaviors within their respective occupations are another common focus of information seeking and use investigations.

Many different user groups have been investigated to date, such as scientists, engineers, managers, scholars, journalists, farmers, and artists. In this section, we'll look at three examples of such information behavior investigations: one that focuses on the information seeking of people who regularly use structured data sets from online sources for their jobs; one that focuses on professional journalists' use (or nonuse) of user-generated content (that is, content produced by citizen journalists) in their news stories, specifically in relation to the Boston marathon bombings and the ensuing manhunt; and one that focuses on the information behavior of Hispanic farmworkers around the potentially fatal condition of heat-related illness.

Koesten, Kacprzak, Tennison, and Simperl (2017) conducted a mixed-method study to investigate the information-seeking behavior of people who hold jobs (e.g., data analysts, scientists, financial traders, managers, IT developers, artists) in which they search online for structured data, such as databases, spreadsheets, and Web tables, on a daily basis. Aiming to inform their subsequent design of tools and technologies that better support people in their searches for, and assessment of, online data, these researchers conducted in-depth interviews with twenty data workers and analyzed the search logs of [data.gov.uk](http://data.gov.uk), a portal for finding open government data.

Koesten et al. (2017) recruited data workers for interviews using targeted emails to fifteen members of the United Kingdom's governmental Open Data User Group (a group of people who collected the opinions of open data users/reusers to influence the data releases issued by the UK government's Public Sector Transparency Board). They also used social media to recruit participants through the Open Data Institute (an independent nonprofit company that helps companies and governments to offer open, trustworthy data) account. Their final sample consisted of seventeen male and three female data workers from the United Kingdom ( $n = 16$ ), Germany ( $n = 1$ ), the United States ( $n = 1$ ), France ( $n = 1$ ), and globally ( $n = 1$ ). Participants came from a wide range of sectors and

held diverse roles, such as crime and disorder data analyst, quantitative trader, data artist, and business intelligence manager.

In their interviews, Koesten et al. (2017) asked about participants' searches for new data and how they evaluate and explore data sources that might be relevant for them. More specifically, they sought to learn what participants are using data for, what types of information they require in order to determine what data to select, which search results are useful to them, how and where they search, and how they explore and understand data sets. Koesten et al. (2017) found that participants used a range of strategies to search for data, including using search engines, particular sites (such as portals or catalogs), other people's recommendations, and Freedom of Information Requests. Of the 20 data practitioners interviewed, 12 (60 percent) said that they regularly struggle in their attempts to find data online. When using Google to locate data sets, participants used keywords, such as "data", "statistics," and "data set," as well as keywords that pertained to the particular domain of interest to them. Once they had located data, some participants spent considerable effort to evaluate and explore the data as they determined whether or not they would use it. They based their judgments regarding the potential usefulness of data on their assessments of how relevant the data seemed to their task, as well as its usability and quality. Participants reported that they needed particular pieces of information in order to successfully work with a data set, including its coverage, quality, timeliness, provenance, and the methods that were used to collect the data. However, this information was not always available. In fact, 15 (75 percent) participants reported struggling with data sets that lacked documentation and that used inconsistent labeling.

In conclusion, Koesten et al. (2017) propose a "Framework for Human Structured-Data Interaction" and offer specific design recommendations for data publishers and data platform designers to make it easier for users to find, assess, and explore online data sets. They recommend that data portals include visual or textual indicators of a data set's relevance, usability, and quality, and that these indicators be tied to user-generated reviews or automatically

computed metrics. Koesten et al. also recommend that platforms build in additional filtering capabilities, enabling users to limit their results based on facets such as the data set's location, time frame, and provenance. In addition, they suggest that users be provided with information about the granularity of a data set so they can make better judgments about the likely relevance of each data set for their current task.

In a second study of the work-related information behaviors of people in a particular occupation, Loke and Grimm (2017) conducted in-depth interviews with the three *Boston Globe* journalists who were in charge of managing the content on the newspaper's live blog during their weeklong coverage of the Boston marathon bombing in April 2013. Loke and Grimm wanted to investigate how these journalists used the reports of citizen journalists in their breaking news coverage of the bombings and the manhunt that followed. Their interviews, which lasted from thirty-five minutes to an hour, were audio-recorded, and transcripts were subsequently prepared. The researchers then used open coding (looking through transcripts to identify any themes that might emerge from the data) to analyze the transcripts.

Loke and Grimm (2017) found that the *Boston Globe* journalists never used citizen journalists' accounts of the bombing-related events without first verifying them, drawing on multiple sources. However, they did indicate that they used user-generated content for two purposes during this time – enabling residents to fill in a spreadsheet, offering a spare bed or room to anyone who had no place to stay due to the bombings, and using social media posts to identify and contact potential interviewees. One journalist described how she was able to vet all of the tweets that came into the live blog, pointing out that just fifteen to twenty Twitter accounts fed directly into the blog and that these accounts all belonged to people that the newspaper had already vetted, such as the newspaper's reporters and their affiliates. This journalist described vetting not only for reliability but also relevance. She removed Twitter feeds that she felt were not supplying relevant information.

All three *Boston Globe* journalists emphasized the importance of credibility to ensure that the newspaper's readership could trust them to supply accurate information. They described not spreading the incorrect report issued by the *New York Post* that twelve people had been killed by the bombs. They emphasized the importance of accuracy over being the first to report something. The journalists further described how they ensured the credibility of their reports by following the updates issued by journalists whom they trusted. They emphasized that it was their responsibility to report only information that was accurate, as misinformation could have implications for public safety.

The three journalists explained that they were able to avoid relying on possibly untrustworthy sources because they had trusted sources (*Boston Globe* journalists, as well as freelance and student journalists with whom they had worked before) distributed throughout the city who were reporting on the bombings and the subsequent manhunt. They were also able to draw on trusted information they received through law enforcement agencies and through their TV news affiliate. As a result, they did not need to rely on reports from citizen journalists.

In conclusion, Loke and Grimm (2017) point out that the *Boston Globe*'s reliance on professional journalists prevented citizen journalists from establishing themselves as sources of reliable information. Thus, potential new alliances between the newspaper and specific citizens could not be formed. Although studies have found that citizen journalists can make valuable journalistic contributions during a crisis and that some audiences prefer their reports over professional journalists' reports, the *Boston Globe* insulated itself from such accounts during the Boston marathon bombings. Loke and Grimm point out that, going forward, citizen journalists who did try to contribute content to the *Boston Globe* may be unwilling to do so in the future. As such, the newspaper may find itself unable to feature citizen's stories, should they wish to do so in the future.

In a third investigation of the information behaviors of workers, Luque, Bossak, Davila, and Tovar-Aguilar (2019) conducted five focus groups with Hispanic farmworkers in South Carolina in order to find out about their past experiences with heat-related illness (HRI), any related training they had received from their employers, and their information-seeking preferences with regard to HRI information. Staff members in three facilities serving Hispanic farmworkers (two health clinics and a migrant head start facility) recruited six to ten participants each for the study. A trained moderator conducted each of the focus groups in a conference room at the respective facility, with participants joining either in person or over the phone. Participants were offered a \$20 gift card as an incentive for their participation in the study.

A total of twenty-nine people (fifteen men and fourteen women) participated in Luque et al.'s (2019) focus groups. Participants were first asked to complete a demographic questionnaire; then the moderator used a structured guide to ask them about a range of topics, including which sources they turn to for reliable information, their past experiences with HRIs and any other work-related illnesses or injuries, their strategies for preventing HRI, and any training they had received from their employer on HRIs. Last, participants were shown HRI-related information in different formats (brochures, radio, conversations with others, posters, handouts, photonovellas (a set of captioned photos that convey a story), and mobile apps) and asked about their preferences for receiving this type of information. At the close of the focus group, the moderator helped participants to download the Spanish-language version of the OSHA (Occupational Safety and Health Administration) Heat Safety Tool mobile phone app, demonstrating how the participants could make use of it. This app provides heat index alerts, lists of HRI-related symptoms, and first aid instructions, aiming to better prepare farmworkers to prevent HRIs.

All focus group sessions were recorded, and transcripts were prepared for the qualitative data analysis process. The researchers used content analysis to analyze the data, identifying emergent

themes and trends. The resulting codebook consisted of thirteen codes organized into four main themes:

1. the risks that farmworkers face and how they protect themselves from these risks;
2. knowledge about HRI and HRI symptoms and treatment;
3. water, rest, and shade (HRI prevention strategies, and OSHA's slogan for their Heat Illness Prevention campaign); and
4. health-care access and access to health-related information.

Included among the thirteen individual codes were the information behavior-related topics of training, health-care seeking, finding health information, and HRI knowledge.

Luque et al. (2019) found that new and inexperienced farmworkers are most at risk for HRIs and that they learned how to protect themselves from HRIs and other job-related risks from more experienced workers, videos, their own experiences, and from firefighters who provided first aid training. Regarding their HRI knowledge, participants were able to identify a wide range of symptoms caused by heat exposure, including headaches and nausea, and described methods they used to recover from HRIs, including drinking water or Gatorade, resting, and wetting one's hat or bandana. Regarding health-care seeking, some participants described just going into the shade and resting if they were feeling heat exposure symptoms. One participant emphasized that she would go to the doctor only if she was very sick, as she believed she would receive a very large bill if she did so. Many participants said they go online when they need health-related information; however, participants in two of the focus groups said they preferred to speak to a doctor or specialist to get information about how to reduce their risks related to sun exposure.

In conclusion, Luque et al. (2019) state that their research led to the identification of some gaps in the heat safety education received by farmworkers. They offer some specific recommendations for better educating farmworkers about HRI prevention, including providing relevant videos and in-person trainings. They also

encourage wider dissemination and adaption of the OSHA Heat Safety Tool app among Hispanic farmworkers.

## IMMIGRANTS

Over the past couple of decades, researchers have been increasingly studying the information behavior of immigrants. One such study is Kim, Kreps, and Shin's (2015) investigation of the health-related information-seeking behaviors of first-generation Korean immigrants to the United States. These researchers used convenience sampling and snowball sampling (see [Chapter 8](#) for more information on these two methods) to recruit 215 Korean Americans from Korean ethnic associations, businesses, organizations, and churches for an online survey (written in Korean). The researchers also asked their friends to participate and to assist in recruiting others who might be willing to participate. Survey questions focused on respondents' health information-seeking experiences within their personal social networks, as well as the importance of social support for enabling them to access relevant health information.

Of the 215 people who completed the online survey, just 135 (63 percent) actually fit the inclusion criteria for the study (between eighteen and forty-nine years old, first-generation Korean immigrant to the United States, and able to speak and write Korean or English) and provided stories about their health-related information-seeking experiences within their personal social networks. Approximately two-thirds ( $n = 86$ ; 64.7 percent) of the 135 survey respondents were female, and respondents averaged slightly more than thirty-three years of age. More than half ( $n = 68$ ; 52.3 percent) of the respondents had completed college, and nearly one-third ( $n = 45$ ; 34.6 percent) had also completed a master, doctorate, or professional degree. The researchers included 129 survey responses in their analyses, for which they used constant comparative analysis (a process in which each new finding is compared and contrasted with past findings, and categories are created, defined, and refined as data analysis proceeds) to inductively identify trends in the data.

Kim et al. (2015) found that survey respondents consulted their friends (frequently Korean friends), members of their church, and family members for health information, emotional support, and companionship. Their health information seeking primarily focused on five topics – hospital/doctor recommendations, preventative care information, information about a specific disease or diagnosis, diet/exercise information, and information about medications. Survey respondents felt that their social networks were integral to their ability to access health information. Nearly half of the respondents' stories ( $n = 57$ ; 42.0 percent) mentioned sharing health information and information about their own health-related experiences with other immigrants, as well as family members, friends, and other members of Korean ethnic associations. Additionally, many respondents mentioned the importance of being able to obtain health information from others in their social network, as they could do so in the language with which they were more comfortable (Korean). Some respondents ( $n = 23$ ; 17 percent) said they felt much more comfortable requesting and sharing health information with other Koreans. The same number of respondents ( $n = 23$ ; 17 percent) said that their social networks actually influence their physical or mental health, such as by encouraging them to adopt healthier behaviors. Approximately 10 percent ( $n = 15$ ) of respondents' stories mentioned dissatisfaction with the US health-care system, as they found it confusing and frustrating, and had encountered difficulties in trying to access or use health-care services. Being able to ask one's Korean friends for information about the health system or insurance (in Korean) proved very helpful for overcoming these challenges.

In conclusion, Kim et al. (2015) emphasize the important roles that personal social networks play in enabling Korean Americans to obtain the health-related information and social support they need. In response to their findings, Kim et al. recommend the development of culturally sensitive programs that can provide health information and support to young and middle-aged Korean immigrants. They also recommend that Korean-language resources containing information about US-based Korean hospitals and physicians, insurance, and

locations where one can get a free medical exam be made readily available to this population. Finally, they point to the tremendous potential of using social networks to disseminate such health information to Korean immigrants to the United States.

## **HOBBYISTS**

Another user group whose information behavior has been increasingly studied is hobbyists, such as amateur genealogists/family historians, collectors (e.g., coin collectors, stamp collectors, and rubber duck collectors), travelers, and gourmet cooks. An example of this type of investigation is Hirsh, Anderson, and Caselli's (2012) study of online fantasy sports players (fantasy football players and fantasy NASCAR (National Association for Stock Car Auto Racing) players) to find out about their information needs and information-seeking behaviors. To recruit fantasy football players, Hirsh et al. used Craigslist and a premier football league (a website where the commissioner (the organizing player) or the league pays a fee to use the service). Recruiting online fantasy NASCAR users proved more difficult, so the researchers hired a nationwide recruiter to assist them. In the end, Hirsh et al. successfully recruited seven active fantasy football players (four of whom played additional types of fantasy sports, as well) and eight active fantasy NASCAR players (six of whom played additional types of fantasy sports, as well). All study participants were male and resided in the United States. They ranged in age from twenty-three to forty-six years old.

Hirsh et al. (2012) conducted one-on-one interviews with their fifteen study participants over the Internet, using Skype, AOL Messenger, and Yahoo! Audio. Interview questions focused on participants' experiences with fantasy sports, the information sources they consulted, the different types of activities they engaged in at different points in the sport season, and the specific websites and types of media they used to make decisions and to play their fantasy sport(s). In addition, they were asked to evaluate some new data sources and state whether or not they would be likely to use them for playing fantasy sports in the future.

Hirsh et al.'s (2012) analysis of their interview data revealed several interesting trends and patterns regarding their participants' information needs and information-seeking behaviors. Interviewees described spending from one to five hours managing their team each week. They consulted a wide range of information sources to manage and make decisions about their online fantasy sports teams, including the Internet, television, radio, and magazines (such as *Sports Illustrated*). The sources they consulted tended to vary depending on the type of task (e.g., making drafting decisions, making trading decisions, or responding to player injuries) they were working on. All participants described visiting multiple websites, including their fantasy site, league sites, forums/community sites, social media sources (such as Twitter), and search engines, in order to obtain the information they needed. The most commonly mentioned sites were [ESPN.com](#)'s community and fantasy sites, [NASCAR.com](#), and Yahoo! Sports. Participants reported that they often found it difficult and time-consuming to locate the detailed information needed to support their decision making, as this information was either scattered across multiple sources or was completely unavailable.

Regarding fantasy sports players' information needs, Hirsh et al. (2012) found that their needs changed depending on when it was in the sports season (e.g., preseason, mid-season, or late season). During preseason, they needed information to make good draft picks. During mid-season, they would regularly check how their team was doing, making and responding to any changes as needed. Many participants described consulting multiple information sources, and several said that they wished that they could go to one place to obtain all of the information they needed. On game day/race day, participants described setting up their lineups in the morning and then checking for any last-minute changes due to absences or injuries. Many participants said that they watched the game/race and used their computer or phone to keep up-to-date on their fantasy scores. In general, participants ramped up their information-seeking toward the end of the season, particularly as playoffs were approaching.

When asked to rate their interest in using new types of fantasy data sources and experiences, such as predictive statistics, trend data, real-time positioning data, and video highlights, participants expressed the greatest need for information that would both minimize the role of luck and make the experience more fun overall. Regarding the former, they wanted access to more data, particularly predictive statistics and trend data that were more accurate and easier to find. Regarding the latter, participants offered some specific ideas they felt would make engaging in fantasy sports more fun, thereby decreasing the likelihood that they or other managers would lose interest in playing. For example, NASCAR players suggested letting players switch their picks halfway through a race, offering greater incentives for a big race, or awarding payouts to top players based on points.

In conclusion, Hirsh et al. (2012) draw on their findings to offer specific recommendations for the design of information systems, websites, and search engines that will more effectively provide fantasy sports players with the information they need, when they need it. For example, they point out that fantasy sports players should be offered different types of information depending on when it is in the sports season and depending on the particular fantasy sports task they are currently engaged in. Additionally, the information they need should be aggregated and made easily accessible; however, Hirsh et al. caution that care needs to be taken to prevent going to the other extreme and causing information overload. Because they found that online fantasy sports players are increasingly turning to social media for the information they need, Hirsh et al. encourage future research into how new social tools can help fantasy sports players gather the information they need and manage their teams.

## VOTERS

Some information behavior researchers have investigated the information seeking and use practices of voters as they educate themselves on candidates and/or relevant issues. For example, Kanihan and Rim (2018) conducted a national online survey during the 2016 primary in order to compare Trump voters with other voters on

a number of measures, including their degree of interest in the presidential campaign; their motivations for following the 2016 campaign; the sources where they obtain their political news; their actual political knowledge; how often they think about campaign news; their confidence in their own political knowledge; and the sources they use to learn about politics.

Using Mechanical Turk (MTurk – a crowdsourcing marketplace run by Amazon; see <https://www.mturk.com>), Kanihan and Rim (2018) recruited people to take their online survey during the run-up to the Super Tuesday primary election on March 1, 2016. Participants had to be US citizens and had to have a task approval rating on MTurk of at least 95 percent. The survey took MTurkers about 12 minutes to complete, on average, and they were paid \$0.50 to participate. Of the 3,322 people who opened the survey link, just 1,608 (48.4 percent) completed the survey. Because MTurkers are more likely to be male and young, the researchers used quota sampling (by using age and gender filters at the top of their questionnaire) within the online survey tool, Qualtrics, to obtain a sample that was more nationally representative. Their resulting sample was 48 percent male and the median age category was thirty-five to thirty-nine years, closely in line with US Census figures (49 percent male and median age of thirty-seven years).

Using various statistical analysis procedures, such as logistic regression and hierarchical multiple regression models, to analyze their survey data, Kanihan and Rim (2018) identified a number of very interesting findings that reached strong statistical significance (that is, findings that one would be very unlikely to reach simply due to random chance). They found that the survey respondents who expressed the most interest in the 2016 presidential primary campaign were more likely to be Trump supporters. In addition, they found that following campaign news for entertainment purposes was a predictor of voting for Trump, while doing so for information purposes was a predictor of supporting some other candidate. Regarding the sources they tend to turn to for political information, survey respondents who reported using YouTube were more likely to

be Trump supporters, while those who reported using Facebook were more likely to support a different candidate.

Kanihan and Rim (2018) further found that the survey respondents with higher levels of campaign knowledge were more likely to support a candidate other than Trump. However, they did not find any statistically significant differences between Trump supporters and supporters of other candidates as to how likely they were to think about campaign news and how confident they felt about their political knowledge. Thus, although Trump supporters tended to be less knowledgeable, they reported thinking about campaign news just as often as supporters of other candidates, and they were fairly equally confident about their political knowledge.

Regarding the sources survey respondents reported consulting in order to learn about politics, Kanihan and Rim (2018) found that no media outlet appeared to contribute significantly to Trump supporters' knowledge; however, use of news websites and radio did approach significance on this factor. In contrast, for respondents who supported some candidate other than Trump, paying attention to news websites and Twitter made positive contributions to their knowledge; however, use of print newspapers, campaign advertising, and YouTube were associated with lower knowledge levels for this group.

In conclusion, Kanihan and Rim (2018) point out a set of similarities between their findings about Trump supporters and earlier researchers' findings about celebrity candidate voters, particularly in their high level of interest in an election and in their particular motivations to follow a candidate's campaign – fun and excitement. Voters who did not support Trump, in contrast, followed campaign news in order to find out about the candidates, to find support for their views, and to prepare to vote. Similarly, while Trump supporters in this study used YouTube (primarily an entertainment outlet) to follow his campaign, non-Trump voters turned to Facebook to follow campaign news. As earlier studies focused on celebrity candidate voters have found, Trump voters in this study tended to be less knowledgeable than other participants about the campaign, but they still had a comparable level of confidence in their knowledge. In

closing, Kanihan and Rim point out that their finding that Trump supporters' media use did not contribute significantly to increases in their political knowledge could be due to this group's motivations based in fun, excitement, and a desire to be entertained, rather than a desire to become informed, which was the motivation found to be much more likely reported by the non-Trump supporters who participated in their study.

## SHOPPERS

Some information behavior researchers (as well as market researchers) have investigated the information needs and information-related activities of shoppers. In the past few decades, some researchers have begun to focus specifically on online shoppers (sometimes referred to as "e-shoppers"). For example, Ocepek's (2016) investigation into the information sources used by grocery shoppers consisted of two empirical studies – one focused on "nurturing shoppers" (people who are the primary grocery shopper for their family) and the other focused on "creative shoppers" (people who love food, cooking, or grocery shopping). Using flyers, public postings, and her interactions with potential participants at recruitment sites, Ocepek recruited eighteen nurturing shoppers (ten women and eight men) who had undergone a transition in the past year – six of these participants had gotten married, six had had their first child, and six experienced someone moving out of their home. She also recruited eighteen creative shoppers (four men and fourteen women) by placing flyers in specialty food stores and cafes. Nurturing shoppers were provided with a \$20 grocery store gift card as an incentive for their participation in the study. Creative shoppers were given a \$10 grocery store gift card.

Ocepek (2016) conducted semistructured interviews with both groups. The interviews with nurturing shoppers focused on the cultural norms around trying to be good shoppers/parents/people and on the ways in which their self-identity as the family food provider and their felt moral obligation influenced their behaviors both within and outside of the grocery store. The interviews with the creative shoppers

focused on their choices and activities within the grocery store information environment. Following seventeen of the interviews with creative shoppers, the researcher observed the study participant as they grocery shopped and the participant was asked to think aloud (that is, talk about what they were doing and why) during the process. All interviews and observations were audio-recorded, and the resulting data were coded both deductively (drawing on themes that had shown up in the findings of other researchers who had conducted relevant studies in the past) and inductively (identifying themes as they emerged from the data gathered for this particular study).

Based on her interviews and observations, Ocepek (2016) identified a total of seventy different information sources that her participants consulted. The most commonly mentioned sources were (in order from most commonly mentioned to least commonly mentioned): one's own personal experience, friends/family members, attributes of groceries, labels on groceries, in-store signs, store flyers, "I've heard"/media (the researcher used this code whenever a participant was not specific, and just said that they had heard something about a grocery item), food television, price tags, and magazines. Across all thirty-six participants, a total of 574 sources were mentioned; however, very few online sources were brought up – just twenty-one of the seventy sources mentioned were primarily online sources. Of the online sources, search engines were mentioned most frequently – ten times (compared to personal experience, which was mentioned ninety-eight times), recipe websites were mentioned eight times, Facebook was mentioned seven times, store websites were mentioned six times, blogs were mentioned five times, Pinterest was mentioned five times, health websites were mentioned three times, Instagram was mentioned twice, Twitter was mentioned twice, and dog food review websites, email subscriptions, online forums, podcasts, and store emails were each mentioned once. Human sources (including one's own experience), in contrast, were much more commonly mentioned. There were a total of ninety-eight mentions of drawing on one's own personal experience, eighty-one of turning to friends/family, five of asking store employees, four

of asking farmers, two of consulting a medical professional, and one of turning to a nutritionist.

Overall, Ocepek (2016) found that her participants were much more likely to consult human information sources and informal sources of information, such as their friends, grocery labels, and in-store signs, rather than formal sources, such as books and the library. In conclusion, the researcher points out that the grocery store information environment is largely tailored to the information needs of grocery shoppers, which distinguishes grocery shopping from other types of everyday information behavior activities. She further emphasizes that the activity of grocery shopping is filled with a wide variety of information sources and that it is a very fruitful area for future information behavior research.

## **PRISONERS**

A user group whose information behavior has been much less commonly investigated is prisoners. One example of such a study is Canning and Buchanan's (2019) investigation of the information needs of, and the information sources used by, long-term adult male prisoners incarcerated in a maximum security prison in Scotland. These researchers conducted semistructured one-on-one interviews with twelve<sup>1</sup> prisoners (ages eighteen through fifty-four) who attended the prison learning center (which housed the prison library and classrooms) to learn about their information needs and the sources they turn to when they need information. They also conducted one-on-one and small group interviews with six prison staff members who directly interacted with prisoners on a daily basis, including the manager of the learning center, three lecturers, and two prison officers, to gather their perceptions regarding the information needs and behaviors of prisoners. Canning and Buchanan's overall aim was to reach a better understanding of the information needs and behaviors of prisoners in order to inform the development of education and rehabilitation programs.

Using transcripts of the interviews, Canning and Buchanan (2019) conducted thematic analysis, reading through transcripts to come up

with initial codes and then grouping codes into themes, refining and adding new themes as they proceeded through their analysis. Although they began their data analysis with some initial codes (some of which were developed from Chatman's Theory of Information Poverty, which encompasses themes related to self-protective behaviors, such as secrecy and deception – see [Chapter 12](#) for more on this theory), they also created new codes to reflect themes that emerged from their own data.

Canning and Buchanan (2019) found that prisoners' information needs primarily related to the topics of education, health, and everyday prison routines, as well as to legal, finance, housing, and employment needs related to their future release from prison. They further found that many of the prisoners' information needs were sensitive in nature, and that many of their emotional needs, as well as their information needs regarding mental health and postrelease life, went unmet. To try to meet their information needs, prisoners primarily used interpersonal sources, such as prison staff (including teachers, librarians, prison officers, health-care professionals, chaplains, and social workers), other prisoners, and family members. In addition, they obtained needed information from television, newspapers, radio, and from resources in the learning center. Librarians and teachers were considered to be approachable and helpful sources of information, and chaplains were described as approachable sources of emotional support. Health-care professionals and social workers, in contrast, were described negatively by many prisoners and were sometimes portrayed as failing to respond to their requests for information, providing ineffective assistance, or even tricking them into doing things they didn't understand (such as signing away their rights to their own personal belongings). Prisoners described obtaining very helpful information about everyday life from other prisoners, appreciating that they could easily and quickly consult one another for information and advice, and benefiting from each other's experience-based expertise. Prisoners also mentioned receiving information and support from their family members, and getting information about the world and life outside prison from television, newspapers, and radio. Regarding

learning center resources, prisoners appreciated being able to request to have books brought in; however, some complained that the resources available in the center were out of date.

Prisoners identified a wide range of factors that negatively influenced their information behaviors, including:

- low self-esteem and not wanting to burden others with their needs for information;
- experiencing stigma and prejudice;
- not being believed by people from whom they sought help;
- not trusting potential sources of information (such as prison officers or other prisoners);
- encountering misinformation and disinformation (such as rumors that quickly circulated through the prison); and
- having difficulties accessing the information they needed.

Several prisoners mentioned that they avoid interacting with prison staff (even if they would like to ask them a question) out of worry that other prisoners will think that they're an informant or "snitch." They also mentioned that issues such as not having Internet access, having restrictions on their access to the learning center and on their telephone use (as well as having their calls recorded and perhaps overheard by people nearby), and being on lockdown blocked their ability to maintain connections with their family and to get the information and support they needed.

In conclusion, Canning and Buchanan (2019) call for future investigations into prisoners' unmet emotional needs and into identifying better methods for assisting prisoners in recognizing their information needs and for effectively meeting these needs. Pointing to earlier studies that have found a correlation between prisoners who have unmet emotional needs and increased aggression and unsuccessful rehabilitation, the researchers assert that addressing prisoners' unmet needs can improve their ability to cope with incarceration and better prepare them for their eventual release.

## **CONCLUDING THOUGHTS**

As you have seen in this chapter, researchers and practitioners draw on a number of different methods to conduct investigations into various user groups' information behavior with a broad range of goals in mind. Many different user populations have been the focus of these investigations, including students, workers, immigrants, hobbyists, voters, shoppers, prisoners, patients, and children. Some investigations focus on the information behaviors of people who sit at the intersection of two or more of these groups, such as international students and immigrant workers. Knowledge regarding different aspects of a particular user group's information behavior (e.g., their information needs, how they tend to go about looking for information, the sources they prefer to consult and the reasons for their preferences, the degree of trust they feel toward various sources of information, and the outcomes of their past information-seeking experiences) can help to inform the design of information resources, services, programs, platforms, and systems tailored to this population. Informed design, in turn, can help to facilitate these users' processes as they work to find, assess, and make use of the information they need.

## **DISCUSSION QUESTIONS**

- List three user groups that describe you, such as student, patient, immigrant, and gourmet cook. Within each of these roles, how do you usually go about seeking information? What strategies do you tend to use? What sources do you often turn to? What are your preferences around information related to this topic? What information sources do you tend to trust the most? Which have you found to be the most useful? Least useful? How successful do you tend to be in locating the information you need? Have you ever encountered any barriers in seeking and/or using information in relation to each role? If so, can you think of some type of resource or tool that might help to facilitate your information seeking and use within the context of this role?

- Thinking back over the studies you've read about in this chapter, which study yielded the findings that you found the most surprising? What particular findings did you find surprising? Why? Do you think that something about the researchers' recruitment, data collection, and/or data analysis methods may have (perhaps inadvertently) led to these findings? Is there some change you would suggest to the authors' methods?
- Thinking about the information science career you're planning to pursue, can you think of any way in which information behavior investigations (like those described in this chapter) might prove useful to you? Can you envision a situation in which you might want to design and conduct your own such investigation? If so, please describe an example of such a scenario.

**Learning Activity:** Select one of the studies described earlier or use Google Scholar (<https://scholar.google.com>) to look for a different study on the information behavior of any user group that interests you. If you decide to use Google Scholar to look for a different study, you'll want to try keywords such as "information seeking," "information behavior," and "information needs," as well as some keywords that pertain to your selected user group (e.g., "information seeking," "first-time voters"). If your query results in a very long list of search results, you might want to further hone your search by selecting a particular date range (such as "since 2015"), specifying a particular geographic region (e.g., "United States") in your search query, and/or adding some keywords that are commonly found in papers reporting findings from empirical studies of people's information behavior, such as "methods," "findings," and/or "results." Once you have located a study of interest, read the paper in full and consider the following questions: (1) What are the advantages and disadvantages of the participant recruitment methods used by the authors? (2) What are the advantages and disadvantages of the data collection and analysis techniques used by the authors? (3) Do you trust the authors' findings? Why or why not? (4) If you were to design a similar study, what adjustments would you make to the design of the study? Why? (5) Propose one or two additional research

questions that you would like to investigate on the topic and outline how you would go about conducting a study that would best enable you to answer the questions you have proposed.

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# 11

## *Connecting Information Behavior and Human–Computer Interaction: User Experience, Accessibility, and Usability*

*Bryan Ramirez, an information science undergraduate student at Tri-Lake College, downloaded a new, free word-processing program from the Internet. When he tried to open his assignment (which he had begun writing in Word, using his friend's laptop), the program simply beeped, providing no message that there was a problem or what the problem was. Bryan eventually figured out a work-around and was able to get his file open in the new program; however, he found the layout of the menus to be so messy that he couldn't find any of the commands that he needed without spending several minutes looking through several layers of menus and submenus. Additionally, the program forced him to work on a background that was a light pea-green color, which he found distracting and actually detested. After trying to work with the program for over half an hour, Bryan decided to just give up and purchase Word.*

*Crystal St. John, a library and information science undergraduate student at Boggins College, had procrastinated working on an assignment for her “Serving Information Needs” course. She needed to compile an annotated bibliography, listing three peer-reviewed journal articles that discussed the various types of accessibility challenges faced by people who are blind or who have low vision as they use the Internet. Suddenly realizing that her assignment was due in just four hours, Crystal tried to access her college library’s databases, closely following the steps her instructor took as she had demonstrated the databases in class the prior week. After much frustration, Crystal realized that the specific library database she needed to access was incompatible with her screen reader. After wasting a good deal of time, Crystal gave up and started looking for other databases that might also be relevant for her project.*

*Nick Clemons, an information science undergraduate student at Pepperell College, was working on an assignment for his “Introduction to Archival Research” class. For this assignment, he needed to gather old newspaper articles about the sinking of the Titanic. Nick went to the special collections library at his college and asked a librarian for assistance with using the microfilm reader. The librarian gave him a very helpful tutorial and then left him to work on his own, telling him to come over to the desk if he needed any further assistance. Once the librarian had stepped away, Nick found that using the reader was quite tedious, and he couldn’t remember much of what the librarian had shown and told him. Using it was not intuitive at all for him, and he found himself feeling quite lost and frustrated. Nick gave up trying to fight with the microfilm reader and turned to Google. Although his instructor for the course had mentioned that most of the sources they’d be using for this class were unavailable online, Nick hoped that she was incorrect and that someone might have uploaded the articles he needed, perhaps to some course site, blog, or discussion forum.*

In this chapter, we'll explore the interrelated concepts of user experience, accessibility, and usability, all of which are integrally tied to people's information behaviors. User experience (UX) encompasses both accessibility and usability, including all aspects of a user's interactions with an information technology, whether a system, a device (such as a tablet), a website, a piece of software, or an application. UX designers and researchers are concerned not only with how usable information technology platforms are but also with the emotions that they evoke, such as enjoyment and delight or confusion and frustration. The first vignette describes a program that offers a very poor user experience: the user interface was so confusing and unappealing to Bryan that a simple word-processing task led to frustration and failure. Accessibility refers to the extent to which an information technology is accessible to all users, including those who have one or more disabilities. In the second vignette, Crystal encounters accessibility issues that are so severe that they completely prevent her from using the library database she wanted to use. Usability refers to the ease with which users can interact with the interface of an information technology. In the third vignette, Nick encounters several issues with the usability of the microfilm reader.

These three terms – user experience, accessibility, and usability – are interrelated in important ways. An information technology is not usable if it is not accessible, and both of these attributes fundamentally influence the user's experience as they attempt to interact with the technology. In the first section of this chapter, we will define and discuss each of these three concepts – user experience, accessibility, and usability – in more depth. In the next section, we'll take a look at some of the many types of research methods and approaches that user experience (UX) and usability professionals use to inform their initial design of information technologies, as well as to later assess the overall user experience and the usability and utility of the technologies for their users. In the last section of this chapter, we will look at a few examples of projects that have taken user-centered design approaches to inform the development of specific information technologies and resources, aiming to tailor their products to the preferences and information behaviors of their target user group(s).

# **DEFINING USER EXPERIENCE, ACCESSIBILITY, AND USABILITY**

## **User Experience**

As defined by Norman and Nielsen (n.d.), user experience (UX) “encompasses all aspects of the end-user’s interaction with the company, its services, and its products.” There are many kinds of factors that influence the user’s experience, including the look and visual appeal of a technology, its features and functionality, its accessibility and usability, and its usefulness (particularly in relation to the individual user’s current needs). Morville (2004) points out that user experience is fundamentally about the interrelationships between the user’s needs and behavior, the business’ goals and context, and the content. Morville’s “User Experience Honeycomb” ([Figure 11.1](#)) depicts seven important facets of the user experience:

1. Useful: Do users actually find the technology/content to be useful?
2. Usable: Do users find the technology easy to use?
3. Desirable: Do users want to use the technology?
4. Findable: Can users find the technology?
5. Accessible: Can everyone, including people who have disabilities, use the technology?
6. Credible: Do users trust the technology and the information it provides?
7. Valuable: Do users (and sponsors, if applicable) value the technology and what it can do?



**Figure 11.1** User Experience Honeycomb (Morville, 2004)

As this list depicts, accessibility and usability are necessary elements of a positive user experience but are not the only considerations. We next turn to each of these two narrower concepts – accessibility and usability.

## Accessibility

As mentioned earlier, accessibility pertains to whether all individuals can make use of and benefit from a particular information technology. The Internet is an example of an information technology that remains largely inaccessible to people who have a disability. Nearly 20 percent of US adults (totaling almost 57 million people) have a disability, while just 50 percent of these individuals report using the Internet on a daily basis. In contrast, nearly 80 percent of those who do not have a disability do so (Anderson & Perrin, 2017). Jaeger (2015) emphasizes that in order to be accessible, technologies “must be usable in an equal manner by all users without relying on specific sense or abilities … [and] must be compatible with the assistive technologies that users may rely on.” Jaeger (2015) further points out that the inaccessibility of the Internet for individuals with disabilities exacerbates existing inequities with regard to education, employment, and civic engagement opportunities, emphasizing that full accessibility of the Internet for every individual is necessary to ensure social justice.

Among the federal laws created to promote accessibility within the United States are the Rehabilitation Act, the Americans with Disabilities Act, the Individuals with Disabilities Education Act, the Telecommunications Act, and the Twenty-First Century Communications and Video Accessibility Act of 2010. The entities (including companies, educational institutions, and government agencies) that are covered by these laws are required to ensure the accessibility of the information technologies that they develop, purchase, or use. Unfortunately, these laws are often ignored and rarely enforced. Moreover, covered entities have frequently taken advantage of “undue burden” clauses, claiming exemption from these laws because they feel that ensuring accessibility for all potential users would be too expensive and/or too inconvenient (Jaeger, 2015).

The World Wide Web Consortium (W3C), founded in 1994 by the inventor of the World Wide Web, Tim Berners-Lee, periodically issues guidelines to ensure the accessibility of Web content for all users. The most recent version (2.1) of the Web Content Accessibility Guidelines (WCAG) was released in 2018. WCAG 2.1 is organized around four central principles. The information/interface must be:

1. perceivable (users can perceive the information and components of the user interface);
2. operable (users can interact with the interface);
3. understandable (users can understand the information and how to use the interface); and
4. robust (users can continue to access the content, even as technologies evolve).

Users who have disabilities cannot use the Web if any of these four characteristics are missing (W3C, 2018).

Although older versions of WCAG have been often ignored (Jaeger, 2015), seventeen of the WCAG 2.0 success criteria were recently incorporated into Section 508 of the Rehabilitation Act of 1973 (United States Access Board, 2017). This move will require compliance with these accessibility guidelines under federal law; however, the undue burden clause remains a possible escape hatch for companies, educational institutions, and government agencies that seek to claim that ensuring accessibility for all is too expensive and/or inconvenient. Although these entities may seek to justify taking advantage of this loophole based on their estimation (frequently, underestimation) of the proportion of their users who have a disability, it turns out that technologies that are designed to be accessible for people who have disabilities are actually more usable for everyone (W3C, 2016).

One example of an innovation that has increased accessibility for everyone is curb cuts, or the ramps in sidewalks and crosswalks (see [Figure 11.2](#)). These pedestrian design features certainly afford wheelchair access, but they also support the needs of “able-bodied” delivery persons pushing dollies or carts with heavy supplies and parents pushing strollers. Indeed, in the United Kingdom, curb ramps are often called “pram ramps” (a pram is a British synonym for a stroller in the United States). The curb cut offers a compelling example of how accessibility guidelines provide inclusive design opportunities that support individuals of all abilities. In the following subsection, we focus on another concept that is very relevant to user experience and that is integrally tied to accessibility – usability.

## Usability

The usability of an information technology is central to the user experience. If the technology is not easy and intuitive to use, the user will likely become frustrated, neither enjoy nor benefit from using it, and may perhaps even abandon using it. The ease with which users can interact with a technology depends on many different factors, including the system's:



**Figure 11.2** Pram Ramp in Mawson Lakes, South Australia

1. Learnability: How easily can users complete their tasks the first time they use the system?
2. Efficiency: How quickly can users complete tasks once they are familiar with the system?
3. Memorability: How easily can users redevelop their familiarity with the system if they haven't used it for a while?
4. Errors: To what extent do users make errors? What is the severity of these errors? How easy is it for users to recover from these errors?
5. Satisfaction: How pleasant do users find the design of the system?

Although usability is extremely important, the actual usefulness of a system depends also on its utility. If a system is easy to use, but it does not meet users' needs and enable them to complete their tasks and reach their goals, users will not perceive the system to be useful (Nielsen, 2012).

Based on his analysis of a large collection of actual usability problems, Nielsen (1994) developed and subsequently refined a set of ten usability heuristics (or rules of thumb) for user interface design:

1. Visibility of system status;
2. Match between the system and the real world;
3. User control and freedom;
4. Consistency and standards;
5. Error prevention;
6. Recognition rather than recall;
7. Flexibility and efficiency of use;
8. Aesthetic and minimalist design;
9. Help users recognize, diagnose, and recover from errors; and
10. Help and documentation.

Each of these heuristics will be described, in turn, in the following paragraphs.

Nielsen's (1994) first usability heuristic – visibility of system status – underscores the importance of keeping users promptly and continually informed about what is happening in the system. The match between the system and the real world heuristic calls for the system to communicate with users using words, phrases, and concepts that are familiar to them. The third heuristic – user control and freedom – emphasizes the importance of enabling users to undo and redo any of the actions they've taken in the system. The consistency and standards heuristic calls for systems to follow widely accepted platform conventions and to use consistent vocabulary in order to avoid confusion. The fifth heuristic – error prevention – recommends that systems be designed in such a way that they prevent user errors or, where this is not possible, check for errors and ask users for confirmation before executing actions.

Nielsen's (1994) sixth usability heuristic – recognition rather than recall – emphasizes the importance of enabling users to rely on recognition, rather than having to recall information about how to use the system. For example, rather than asking the user to type in a particular command (e.g., “sort in descending order”), the system could enable them to simply click on an icon that represents this action (e.g., the sort icon in Microsoft Word). The seventh heuristic – flexibility and efficiency of use – calls for systems that adjust their interactions with a user depending on their level of experience with the system. It also calls for permitting users to tailor the system to more efficiently support the actions they take most frequently. The aesthetic and minimalist design heuristic stresses the importance of limiting system dialogues to the most relevant and frequently needed information so as to ensure the visibility of this information for the user. The ninth heuristic – help users recognize, diagnose, and recover from errors – calls for error messages that are written in plain language, pinpoint the exact problem, and suggest specific solution(s) the user can try. Nielsen's tenth heuristic – help and documentation – points out that, for the ideal system, the user needs no documentation; however, when documentation is required, it should be context sensitive so it is relevant to the user's task at hand, of a manageable size, and easy to search. It should also outline concrete steps that the user can take in the system.

Nielsen's (1994) ten usability heuristics are useful not only for system design but also for the evaluation of existing systems. Moreover, Nielsen's heuristics underscore the interrelationship between usability and accessibility. For example, visibility of system status is aligned with WCAG 2.1's principle of perceivability. Similarly, the robust principle of WCAG 2.1 is analogous to Nielsen's ninth heuristic that users be able to gracefully recover from their errors. As noted at the beginning of this chapter, information technologies must be usable to be accessible and vice versa. We now look at some of the many types of UX research methods and approaches that are used to inform the design of information technologies, as well as to evaluate the overall user experience and the usability of these technologies.

## **USER EXPERIENCE (UX) RESEARCH METHODS AND APPROACHES**

To inform the initial design of information technologies and to assess the overall user experience and the usability and usefulness of an information technology, professionals (including user experience researchers, usability testers, usability specialists, and usability/human factors engineers) conduct research studies with actual or potential users of the product or system, employing one or more of a variety of research methods. They frequently collect both quantitative data (e.g., what did the users actually do as they interacted with the technology?) and qualitative data (e.g., what did the participants think or say as they used the technology?) (Usability.gov, n.d.).

User-centered design focuses on the user at all stages, from the very beginning of the design and development of the technology all the way through to post-evaluations conducted after the technology has been deployed. With this design approach, usability evaluation studies are conducted “early and often,” with the goal of reducing costly design and production errors (Sugar & Boling, 1995). Whether in industry or academia, many studies have demonstrated how early design evaluations, such as paper-based sketches (“paper prototyping”), can reveal unexpected use cases or design misconceptions (Boling & Frick, 1997). By uncovering design misconceptions or new cases early, technology development teams reduce production costs, which can benefit developers and users alike. Likewise, almost all usability issues can be eliminated by continuing usability testing from early prototyping in design labs through field testing in the contexts in which users would typically use the technology, such as an office, at home, or at school (Hertzum, 2016).

In user-centered design, a primary goal for UX designers and researchers is to understand the behaviors, needs, and emotions of users as they work on developing and improving a technology; however, in this approach, the UX designer and researcher remains the expert observer, interpreter, and implementer of the design

process overall. In contrast, participatory design approaches shift the center of gravity of the design process from the expert UX researcher toward a more equal partnership with the end user.

In participatory design, researchers/designers actively involve the technology's intended end users, as well as any other types of stakeholders (such as employers) in the design of the information technology, from initial idea generation to prototyping and production. Participatory design enables designers to learn about the users' actual needs, preferences, skills, knowledge, and goals, while also giving users the opportunity to have a hand in shaping the technology to best fit their needs, preferences, and goals. For example, UX researchers can observe an end user field-testing a nearly finished product or they can collaborate more directly with a user such that both researcher and user work together to explore design ideas for emerging technologies.

The term “co-design” is often used interchangeably with participatory design, but co-design emphasizes the end user’s input to the process itself; in co-design, users are not only brought into the design process as early as possible, but they are also often involved as *equal* partners with designers. In Cooperative Inquiry, a specific type of co-design, children are viewed as full partners with adults because they work together at all stages of the design process, sharing ideas, testing, and evaluating the product from inception to production and deployment (Bonsignore, et al., 2013a). Although children as young as five and as old as seventeen have engaged in Cooperative Inquiry, the most common age range of children involved in these intergenerational teams is seven through twelve years old (Bonsignore et al., 2013a; Guha et al., 2004). Adult co-designers engaging in Cooperative Inquiry have been as young as eighteen and as old as seventy-seven. It may be difficult to imagine how a child as young as seven can be considered a “full and equal” partner in the design of technologies. However, the Cooperative Inquiry design approach consistently strives to revise and extend adult-oriented participatory design techniques so that traditional adult–child power dynamics are reduced.

The first intergenerational team of children and adults who engaged in Cooperative Inquiry to co-design and evaluate various information technologies and technology-mediated experiences for children was called Kidsteam.<sup>1</sup> Professor Allison Druin (Druin, 1999; 2002) developed KidsTeam at the University of Maryland (UMD) in 1998. For more than two decades, the KidsTeam's tagline has been "We design technology *for* children, *with* children." Between 2010 and 2020, in addition to UMD, several universities and organizations have established KidsTeam programs as part of their design practices across the United States, such as Boise State University, Pearson Learning (2013–2016), University of Baltimore, Google, and University of Washington. Although KidsTeam after-school programs practice Cooperative Inquiry as an ongoing process, several participatory design studies have used Cooperative Inquiry techniques to improve the usability and accessibility of information technologies for youth and families. A few of these are briefly summarized in the next section of this chapter, as well as in [Chapter 14](#).

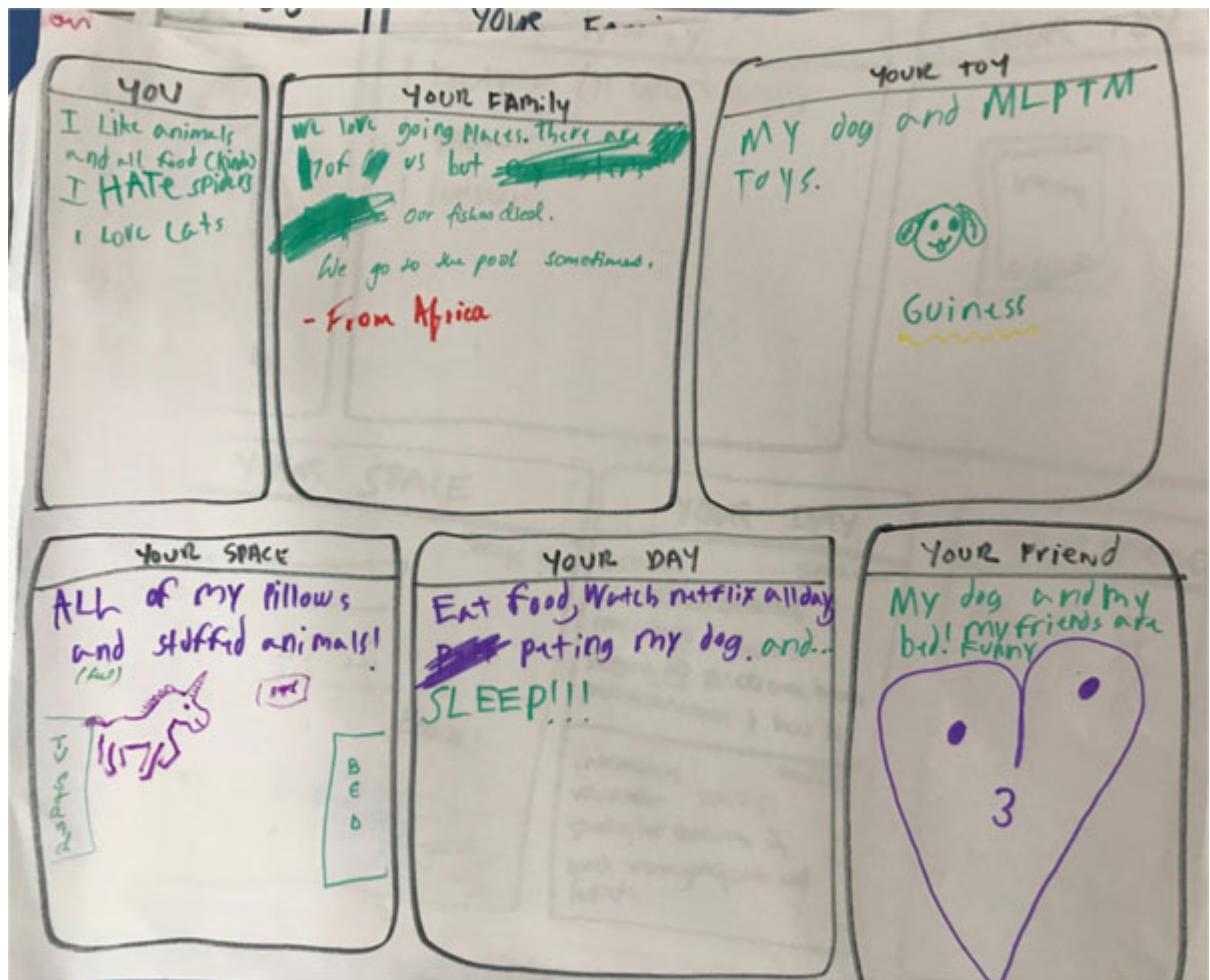
UX and usability researchers draw on a number of different research methods to inform their design of a technology and to assess its usability and utility for actual and prospective users. For example, researchers often conduct surveys, interviews, and/or focus groups in order to learn about their current and prospective users' needs and goals. They may also conduct baseline usability testing on an existing system in order to learn about the users' perceptions. Researchers may also conduct card sort testing, described in [Chapter 9](#), to solicit user input regarding the information architecture (that is, the layout of the content) and wireframe testing to assess the ease with which users navigate the existing structure. Another method that researchers may use is "first-click testing," which enables them to assess whether the user starts down the correct path. Researchers also often conduct usability testing, assessing the complete set of user interactions from beginning to end. Once the technology has been developed and deployed, researchers frequently conduct satisfaction surveys to investigate users' perceptions

regarding the usability and utility of the technology (Usability.gov, n.d.).

All of the research and design methods that are used throughout the user-centered design process can also be used in participatory design approaches. For example, a participatory design will often include an interview, focus group, or usability evaluation with users regarding their technology use. In participatory design, however, a user's role in the design process expands beyond tester to co-designer and co-creator. Participatory design methods include storyboarding different technology use scenarios, as well as brainstorming and prototyping workshops (Simonsen & Robertson, 2013). A storyboard is essentially a user story or scenario told through images or sketches; in storyboarding, designers and users collaborate to create a graphic visualization of a sequence of actions or tasks (Fails, Guha, & Druin, 2012; see [Figures 11.3](#) and [11.4](#)). Brainstorming workshops might include using Post-it notes to generate as many ideas as possible in response to a design challenge; a prototyping workshop would invite designers and users to craft a paper-based solution or interface. The goal for participatory design methods and techniques is to ensure that the end user's voice and perspectives are included as much as possible throughout the process. Although the development of a participatory design community of users willing to participate and provide their input tends to take longer than other user-centered approaches, it is often considered the optimal approach for developing engaging user experiences and technologies.



**Figure 11.3** Children Storyboard Their Daily Lives during a Co-Design Session Reflecting on Their Identities as “Designers”



**Figure 11.4** Sample Storyboard by a Child about Her Daily Life and the People, Animals, and Things that Are Important to Her

Cooperative Inquiry techniques enable intergenerational teams of children and adults to co-design in ways that maximize shared elaboration yet minimize differences in age and ability. For example, Cooperative Inquiry use a wide variety of materials and design tools throughout the co-design process, such as arts-and-crafts materials to support low-tech prototyping, “big paper” to storyboard interactions, and Post-it notes to cluster design ideas into actionable requirements during system evaluation and beta testing (Fails et al., 2012). Paper-based, low-fi prototyping materials support the ideation process and are familiar to child designers, enabling them to focus on the design prompt, not design-tool usability. Adults play active roles

by helping young designers to articulate and synthesize their ideas, but children are given equal voice and have even led co-design sessions (Yip et al., 2013).

Central to participatory design, co-design, and Cooperative Inquiry is the important recognition that designers and UX researchers who do not involve, or at least consult, actual and/or potential users of their systems before, during, and after the design process risk developing a system that is not relevant, appealing, usable, and/or useful to the very people who they were aiming to help. Ideally, all user-centered and participatory design approaches and methods help to improve the design of technologies and to enhance the experiences that people have when they encounter and use these interactive systems. In user-centered design, technologies are frequently iteratively pretested, tested, improved, and retested, involving potential and/or actual users at all stages along the cycle. Such iterative designing, developing, testing, and improving of information technologies can help to ensure the accessibility and usability of the technology, as well as a positive experience for the end user.

## **EXAMPLES OF INFORMATION TECHNOLOGIES DEVELOPED USING USER-CENTERED AND PARTICIPATORY DESIGN METHODS**

Today, user-centered design methods are considered best practices for UX designers and researchers to ensure that new technologies and systems are usable and accessible for the target user group(s). User-centered design has contributed to the design of interactive health care (Dabbs et al., 2009) and online learning (Boling & Frick, 1997), and participatory design has also been used effectively with a variety of user populations in many different contexts, such as older adults (Ellis & Kurniawan, 2000; Langdon, Lazar, Heylighen, & Dong, 2014) and communities tackling urban planning and policy (DiSalvo, Clement, & Pipek, 2013). In this section, we will look at a few examples of projects that have employed user-centered design methods to optimize the design of online resources, including a

multicultural, multilingual online library; “tactile” books for blind youth; and resources to help children navigate online privacy issues and concerns.

The International Children’s Digital Library (ICDL) (<http://en.childrenslibrary.org>) is a freely available, online collection of children’s literature from around the world that includes more than 4,500 books in 61 languages, representing 65 different countries (Figure 11.5). The ICDL is an early example of an information technology project that was successfully guided by participatory design, resulting in an intuitive and engaging interface.



**Figure 11.5** The International Children’s Digital Library (ICDL) Search Interface, Designed at the University of Maryland

During its first decade (2002–2012), more than 6.5 million children and adults from 228 countries visited the ICDL, with an average of 100,000 visitors logged per month. In 2020, the library is still being maintained, though new development ended in 2013. The design goals for the ICDL were to inspire intercultural awareness in children (ages 3–13) by providing broad online access to an international collection of children’s literature; to create new technologies that were age appropriate and engaging; and to expand existing participatory design methods by involving children in the design

process (Druin, 2005). From 2000–2005, the first KidsTeam at UMD engaged in iterative, participatory design cycles testing the viability of various search/browse/reading interfaces (Druin, 2005; Hutchinson, Druin, & Bederson, 2007). KidsTeam's co-design approach offered insights into children's book-browsing, searching, and online reading behaviors. For example, co-design sessions confirmed that children prefer to search for books in ways that reflect physical, image-based features (e.g., colors on the cover) or affective elements (e.g., a "happy" or "sad" book). These findings resulted in the development of an innovative and popular search interface as well as new metadata categories for library cataloguers to consider (Druin, 2005).

The ICDL's design has been shown to increase children's motivation to read, expand the variety of books they choose, and support their interest in exploring different cultures (Druin, Weeks, Massey, & Bederson, 2007). One of the co-design findings from the ICDL project was that children wanted not only to read books from around the world but also create and share their own stories, often in the same "mobile" ways that they used print books: in the lap of a grandfather or on a bus with a friend. [Figure 11.6](#) shows the ICDL and StoryKit mobile apps for iOS devices.



**Figure 11.6** The ICDL and StoryKit Mobile Apps for iOS Devices (iOS version 9 and below only)

As with the ICDL, a team of adults and children (ages 7–77) co-designed StoryKit, a mobile application (app) that enables the creation of multimedia stories on iOS devices. With StoryKit, children can create original stories using their own photos, drawings, text, and audio, and then share their creations online. The co-design process resulted in the design of an intuitive, integrated interface used by children, families, and educators around the world. Between 2009 and 2013, StoryKit was used more than 2 million times by more than 385,000 distinct users in 175 countries and in 40 languages and dialects (Bonsignore et al., 2013a). In one 2-year study of StoryKit's

use in the United States, Canada, Australia, the United Kingdom, and New Zealand, researchers found that StoryKit's audio tool, which was integrated in its design as a result of Cooperative Inquiry, helped children in early primary grades (ages 5–7) to tell stories orally first, helping to scaffold their initial efforts to read and write (Bonsignore et al., 2013b).

Co-design and storytelling with StoryKit have also influenced the design of science learning experiences. A study by Clegg et al. (2012) revealed that interactive, multimedia-rich technologies like StoryKit empower children to capture everyday science experiences (like cooking) in personally meaningful ways. Similarly, Bonsignore et al. (2016) employed co-design methods and storytelling to learn more about the attitudes of older youth (13–15 years old) toward scientific inquiry. In this project, teenagers in an after-school program contributed to the interactive storyline and interface of a transmedia game designed to promote scientific inquiry and collaborative learning. A transmedia game is an experience with multimedia elements that are presented to players in both online and face-to-face contexts, using everyday applications like email, text messaging, or video (Bonsignore et al., 2016). Teens who participated in the co-design sessions for this study not only helped to create in-game characters and aspects of the interactive storyline but also developed an interactive widget that promoted teen players' efforts to learn science concepts embedded in the game. The adult members of the co-design team noted that this popular in-game feature would not have been created at all without involving teens throughout the ideation and prototyping process (Bonsignore et al., 2016).

More recently, two participatory design studies turned their attention to how children view and want to engage with online privacy issues. Kumar et al. (2018) collaborated with children (8–11 years old) from UMD's KidsTeam in a series of co-design sessions to explore their responses to existing privacy education resources and to elicit their design ideas for new resources. This co-design work generated several design implications for privacy researchers working with young children, such as (1) privacy education resources should include easily understandable storylines and relatable

characters and (2) privacy education should go beyond simple “dos and don’ts” by exposing children to a range of privacy risks and guiding them toward more informed privacy decisions.

Relatedly, in two co-design sessions conducted with UMD’s KidsTeam, Badillo-Urquiola et al. (2019) explored how young children (7–11 years old) understand “stranger danger” in social media and what children imagine that social media designers can do to respond to these online risks. The co-design sessions revealed that children often underestimate online risks because technology mediates their interactions in ways that make them feel safe from physical harm. This study also found that children wanted varying degrees of agency to respond to online safety concerns, depending on the severity of the risk (Badillo-Urquiola et al., 2019). In most cases, the children felt that social media app developers should assume more responsibility in promoting online safety and also wanted help resolve the issue themselves instead of relying on their parents to do it for them (Badillo-Urquiola et al., 2019). Both studies have extended youth online privacy and safety research through participatory design methods that actively involved children, from evaluating existing privacy education resources to proposing new features for emerging technologies.

Several information technology studies have demonstrated that integrating participatory design methods with accessibility guidelines can result in technology designs that are more universally usable. These studies are sometimes referred to as “inclusive design” and have used participatory design approaches with blind users, deaf users, older adults suffering from dementia, and individuals on the autism spectrum (Langdon et al., 2014). For example, Hourcade, Bullock-Rest, and Hansen (2012) used co-design techniques with children on the autism spectrum in collaboration with their parents and teachers to develop a set of design guidelines for mobile apps and technologies. Similarly, Kim and Yeh (2015) conducted several user-centered and participatory design workshops to develop tactile, 3D-printed books for blind and visually impaired children. As part of their efforts to make 3D-printed books more accessible to parents and teachers of visually impaired and blind children, Stangl, Kim, and Yeh

(2014) have created a small library of downloadable 3D-printed excerpts from popular children's books (like *Goodnight Moon*), and they have used user-centered survey and interview methods to gather feedback about the usefulness and usability of these tactile products. Their work has enabled teachers and families of blind and visually impaired children to participate directly in the design of tactile books and to add valuable insights into how designers can increase access for everyday users to special technologies, such as 3D printers.

## CONCLUDING THOUGHTS

In this chapter, we have explored the interrelated concepts of user experience, accessibility, and usability, all of which influence the ways in which people interact with information technologies and seek information. We have seen how user-centered design approaches that include user perspectives can improve how people use and experience various interactive technologies. We have shown how designs that integrate accessibility guidelines as a natural extension of user-centered methods are more universally accessible to all users, not just those with disabilities related to mobility, vision, hearing, or cognition (e.g., autism and dementia). We have shared several studies that have employed user-centered and participatory design methods to ensure that end users contribute to the design of enhanced, intuitive information technologies that both align with their preferences and facilitate their information behaviors. These design methods offer a clear way to prevent (or at least minimize) the usability challenges and resulting user frustration and abandonment described in the chapter's opening vignettes with Bryan, Crystal, and Nick.

## DISCUSSION QUESTIONS

- Throughout this chapter, we have explored the connection between the design of information technologies and how such designs can affect information behavior. Think about a recent

situation in which you searched for information using any sort of information technology, such as a search engine or similar online database, a specific app on your smartphone, or an application on a laptop/tablet/desktop. Describe the experience you had with the system interface in terms of Nielsen's heuristics and/or Morville's User Experience Honeycomb. Was there any aspect of the experience that was desirable? For example, did you want to use the system to help you find the information sought or were you afraid the system would be difficult to use? Were the system's interactive components consistent throughout the interface, affording recognition over recall? Did they help you prevent errors or, if you made an error, how easy was it to recover or "undo" the error without having to start your task over completely?

- Consider the example of "curb cuts" as a design feature that integrates user-centered design principles with accessibility guidelines to create a universally inclusive design. What are some other features of information technologies that you have used that reflect similar universal access? Alternatively, how might you expand the features of existing technologies to ensure that they are universally accessible or, at least, reflect some consideration for populations that are typically marginalized?
- Select one of the studies described in this chapter and describe your thoughts about how various user-centered and participatory design methods engaged end users and resulted in designs or findings that could not have been accomplished with other research and design methods that did not involve them. Do you think that other methods could have potentially resulted in similar findings? Why or why not? How could you incorporate participatory design into an information technology design study?
- Design a participatory design study to investigate the information behaviors of a particular population (e.g., middle-school students, users with visual impairments, older adults) as they engage with a particular information technology or resource. Once you have selected a particular population, think of one or two research questions that you would like to investigate. How

would you go about recruiting participants and gathering data that would enable you to answer your research question(s)? Why would your selected methods be ideal for your investigation? Why is it important to answer the research question(s) you've posed?

- Thinking about the information science career you're planning to pursue, how might you use the principles of usability and accessibility in your work? How might the use of participatory design approaches help you to accommodate your target users'/customers'/patrons' preferences, facilitate their information-seeking behaviors, and optimize their chances for success in achieving their goals (such as gaining access to the information they seek)?

**Learning Activity:** Select one of the stories at the beginning of this chapter. How might the challenges encountered by Bryan, Crystal, or Nick have been prevented? Describe two studies that user experience researchers could have conducted – one that would have helped to prevent these problems from reaching the user and one that would have helped the researchers to promptly identify that their users were encountering these specific challenges and to learn how to best address these issues.

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## Note

1. The Kidsteam program was initially spelled “Kidsteam,” where the second word (“team”) of the compound word was not in capital letters. Since 2016–2017, most Cooperative Inquiry-Based KidsTeam programs use the “camel-case” spelling – i.e., capitalizing the letter that starts each word in the compound expression.

# 12

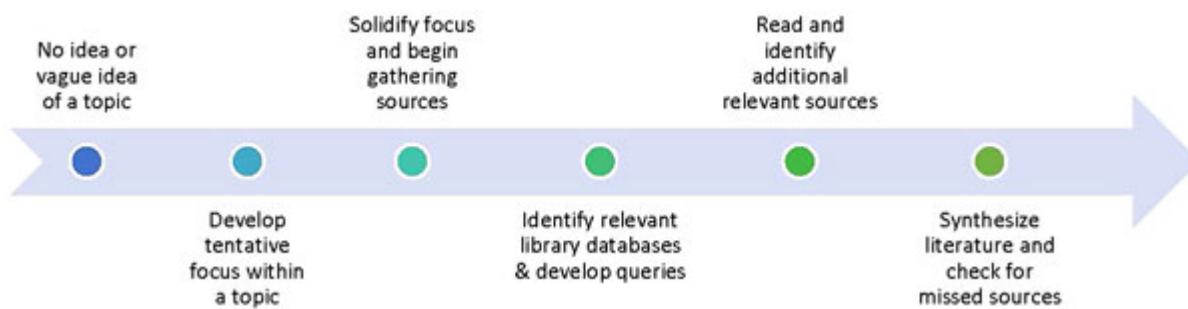
## *Information Behavior Models and Theories*

*Dr. Alicia Reyes, a librarian at City Community College, noticed that there were common patterns in the information behaviors of the students who sought her help with their research assignments. Students often came to their first meeting with her with either no or just a very vague idea of a topic they were interested in. During the course of this initial meeting, they tended to develop a tentative focus within their selected topic. They then tended to go off to work on their own, solidifying their focus and beginning to gather sources that they might draw from. Frequently at this point, they again contacted her to ask for her help in identifying relevant library databases they could turn to and in developing queries that would enable them to effectively and efficiently retrieve useful articles for their research. Once she had assisted them with these processes and they had successfully retrieved a few relevant sources, they again went off to work on their own, carefully reading the retrieved articles and using the knowledge they gleaned from them, as well as their reference lists, to identify additional sources. They then frequently contacted her again to seek her help in developing a*

*synthesized picture of the literature they had gathered and in conducting some final searches in order to make sure that their review of the relevant literature was as thorough as possible. Noticing these patterns, Dr. Reyes sketched out the following model of the information behaviors of City Community College students as they worked on research assignments for their classes. (see Figure 12.1)*

*Building upon her model, Dr. Reyes then worked toward developing a theory of community college students' information behaviors when working on a research assignment. Although her model enabled her to describe, and thus predict, the actions the students would take as they worked on a research assignment, her theory would further delve into the reasons why they engaged in these activities. In order to develop her theory, Dr. Reyes conducted semistructured interviews with thirty community college students with whom she had worked during the past academic year. During each interview, she asked the student to walk her through the steps they had taken to complete their most recent research assignment, explaining the rationale behind each of their decisions and actions. Based on all of the data she gathered, Dr. Reyes developed a theory that consisted of a few key concepts and a series of several propositions that described and explained community college students' information behaviors when working on a research assignment.*

\* \* \*



**Figure 12.1** Model of the Information Behaviors of City Community College Students Completing a Research Assignment

In this chapter, we will define the concepts of “model” and “theory” within the context of information behavior and explore some of the many models and theories that have been developed to characterize people’s information behavior within various contexts. As illustrated in the first part of the vignette, an information behavior model describes the stages through which people advance as they gather (or avoid), manage, share, and use (or not) information in order to perform some type of task or activity. In the second part of the vignette, Dr. Reyes conducts a qualitative research study in order to develop a theory. She seeks to understand not only how City Community College Students go about completing a research assignment but also *why* they go about this process in the ways that they do. Her resultant theory is comprised of a set of informed beliefs as to the reasons these students go through the specific set of stages she has laid out in her model.

It is important to note that both models and theories are extremely oversimplified representations of people’s actual information behaviors. Because people’s information behaviors tend to be quite complex, it is simply not possible to draw a model or develop a theory that accurately and adequately conveys/explains every individual’s information behavior across every context. Models, for example, tend to be quite linear (as in the previous example); however, it is a quite common finding in information behavior studies that people’s information behavior tends to be nonlinear and iterative. People frequently return to earlier stages (as needed), don’t strictly adhere to the designated order of the stages, and sometimes even skip one or more stages altogether. A common convention within information behavior models is to use dotted arrows between stages to indicate that the advancement between two specific stages may or may not occur. Another common convention is to incorporate bidirectional arrows to show that people frequently return to earlier stages in their information behavior process.

Theories, too, are oversimplifications. For any theory, one can always find a counterexample. People's behaviors, along with the rationales for their behaviors, tend to be quite nuanced and are very difficult to perfectly describe, predict, and explain within any given context. This is particularly true when one tries to do so across multiple contexts.

Information behavior models and theories are frequently developed within (and thus are meant to be applicable to) a specific context, such as work, school, or everyday life. Models, which tend to be more specific and concrete, tend to be developed by information behavior researchers before they come up with a more encompassing theory. However, in some cases, information behavior researchers may develop a theory first and then later build a model in order to illustrate their theory. In many cases, the dividing line between what constitutes a model and what constitutes a theory is somewhat blurred. In fact, some models appear to be more theory-like and some theories appear to be more model-like.

Over the past half-century or so, information behavior researchers, as well as information professionals such as librarians, have developed many different models and theories of people's information behavior. Although most are very context specific (e.g., school, work, a particular aspect of everyday life, such as information behaviors relating to one's health), others are more general in nature. Even models that were developed in very specific contexts, however, are sometimes more broadly applicable to people's information behaviors within other situations.

In the next section of this chapter, we will explore a few of the many information behavior models and theories that have been developed within each of the three major contexts mentioned earlier: (1) school/research, (2) work, and (3) everyday life. In addition, we will discuss a few models and theories that are not context specific and are therefore more general in nature. To conclude the chapter, we will discuss why information behavior models and theories are important and useful, illustrating this point with some real-world applications.

# EXAMPLES OF INFORMATION BEHAVIOR MODELS AND THEORIES

## School/Research Context

Many researchers have modeled the information behaviors of students and scholars as they gather sources and work on writing various types of research papers, typically in an academic or work setting. In this section, we'll look at Kuhlthau's (2004) Information Search Process Model, Bates' (1989) Berrypicking, Pirolli and Card's (1999) Information Foraging Theory, and Ellis' (1989b, 1993) Characteristics of Scientists' Information Behavior.

### *Kuhlthau's (2004) Information Search Process (ISP) Model*

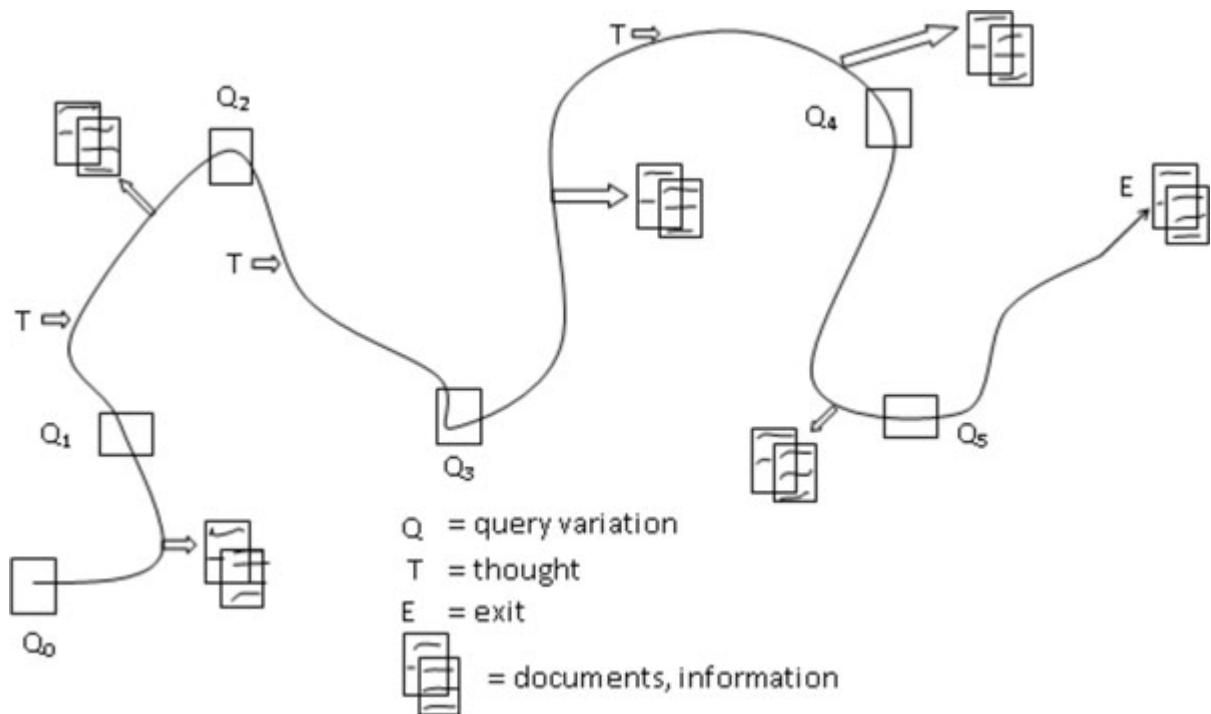
Dr. Carol Collier Kuhlthau (2004) developed the Information Search Process (ISP) Model based on her study of the information-seeking processes of academically capable high school seniors who were working on research papers for their English class. Kuhlthau used a variety of qualitative data collection techniques to gain an understanding of these students' experiences of the research process. She interviewed students and asked them to keep journals, fill in search logs, write a series of short statements about their selected topics, and draw flowcharts and timelines depicting their processes across time. Based on her analysis of the resulting data, Kuhlthau found common patterns across all of the students' experiences and identified a series of stages the students tended to go through, each of which was characterized by specific types of thoughts, feelings, and actions. [Table 12.1](#) shows Kuhlthau's ISP Model. This model demonstrates that, as students move through the research process, their thoughts progressed from unclear and vague to clear and focused. At the same time, their emotions shifted from confusion, frustration, and uncertainty to confidence, certainty, relief, and finally, either satisfaction or dissatisfaction with their performance.

### *Bates' (1989) Berrypicking*

Information retrieval and information behavior researcher Marcia Bates (1989) developed an early model of people's information retrieval processes. Bates offered an alternative approach to the traditional model of information retrieval at the time (sometimes termed the "one-shot" query model) that held that people's information needs are static and can be unproblematically fulfilled with one single best set of search results. Bates believed that, more often than not, people retrieve information a bit at a time from multiple sources, and their information needs, their search techniques, and the sources they consult all tend to shift as they work to resolve their information need. Bates called this type of bit-at-a-time information retrieval "berrypicking" and this type of shifting search an "evolving search." [Figure 12.2](#) depicts Bates' berrypicking, evolving search. Her model shows that people's queries, thoughts, and the documents they consult all tend to shift as they go about retrieving information to fulfill an information need. Although Bates developed her model within the context of academic researchers and students searching for relevant books and articles, her model holds up across a wide range of different contexts. For example, think about the last time that you were looking for information for an important information need. Did you simply come up with one query and go with one of the first search results returned? Or did you go on to conduct additional (more honed) queries, consult other types of sources, or take other actions?

**Table 12.1. Kuhlthau's (2004) Information Search Process (ISP) Model (p. 45)**

Stages	Task Initiation	Topic Selection	Prefocus Exploration	Focus Formulation	Information Collection	Search Closure	Starting Writing
<b>Feelings (affective)</b>	Uncertainty	Optimism	Confusion/ Frustration/ Doubt	Clarity	Sense of direction/ Confidence	Relief	Satisfaction or Dissatisfaction
<b>Thoughts (cognitive)</b>	ambiguity				specificity		
						increased interest	
<b>Actions (physical)</b>	seeking relevant information				seeking pertinent information		



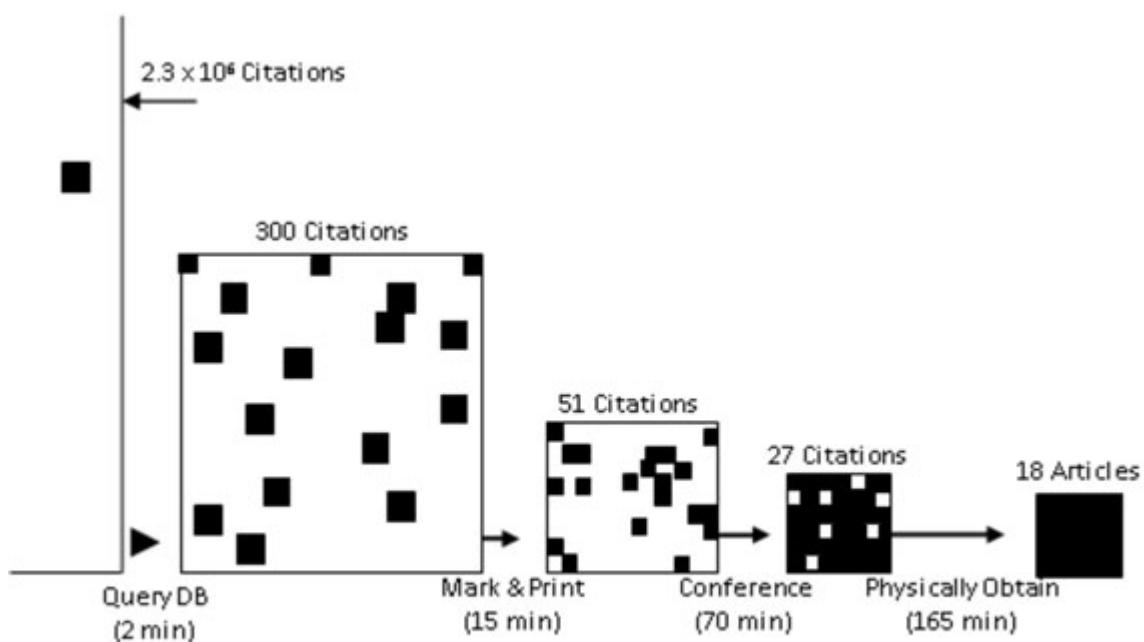
**Figure 12.2** Bates' (1989) Berrypicking, Evolving Search (p. 410)

### *Pirolli and Card's (1999) Information Foraging Theory*

While researchers at Xerox Palo Alto Research Center, Peter Pirolli and Dr. Stuart Card (1999) developed Information Foraging Theory, explaining how people allocate a very scarce resource (their attention) in today's culture of information overload. The basic premise of this theory is that people adapt their information-seeking strategies, as well as their environment, so as to maximize the amount of useful information they gain for their efforts. For example, people will turn to the source that is likely to have the most useful information related to their information need. Similarly, they will adapt their environment accordingly. For example, a student working on a research paper will likely pull up just the most relevant articles on their computer so that they're all readily available, while ensuring that extraneous material is not cluttering their limited screen real estate.

Pirolli and Card developed a model ([Figure 12.3](#)) to depict the information foraging processes of a team of MBA (Master of Business Administration) students who were performing research in

preparation to write a strategic management analysis report for their class. The model depicts how the team progressively reduced the size of, and increased the relevance density of, their information diet. In other words, they whittled down the set of articles they would ultimately go and get to just those that were the most relevant to their project. This process enabled them to more efficiently engage in future information foraging, limiting the amount of time they would have to spend looking through them and maximizing the likely usefulness of the information they would obtain by going through their smaller set of articles. Although this example is specific to the school context, Information Foraging Theory has been broadly applied to a wide variety of other contexts, including people's information behaviors as they search for information online (Chi, Pirolli, Chen, & Pitkow, 2001).



Information from the strategic management analysis example. Width indicates time investment in activities, height indicates total documents, dark fill indicates relevant documents, and white fill indicates irrelevant documents. Times in parentheses are cumulative. DB = database.

**Figure 12.3** Information Foraging Example (Pirolli & Card, 1999, p. 650)

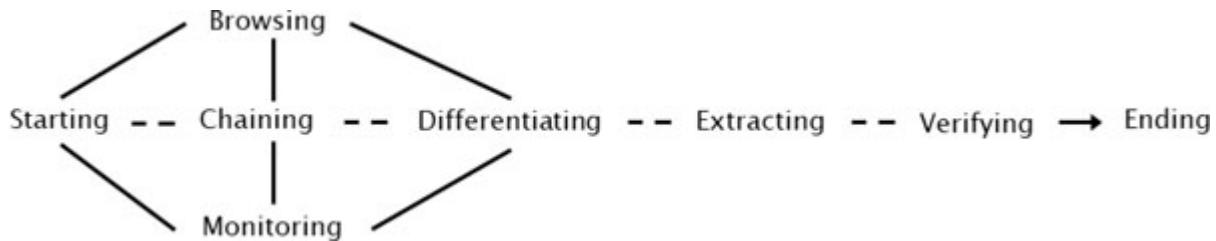
*Ellis' (1989b, 1993) Characteristics of Scientists' Information Behavior*

Information behavior researcher David Ellis (1989b, 1993) conducted qualitative interviews with academics and researchers in various science-related fields (including the social sciences, physical sciences, and engineering) in order to learn about their information-seeking processes as they conducted their research. Ellis identified six characteristics of these scientists' information behavior:

1. Starting: beginning the search for information;
2. Chaining: jumping forward or backward in time from initial sources consulted to other relevant sources, such as obtaining the articles cited in an initial source (backward chaining) or checking to see who has subsequently cited an initial source (forward chaining);
3. Browsing: looking through a gathered set of information;
4. Differentiating: identifying differences in sources, such as the types and quality of the information they contain;
5. Monitoring: taking steps to keep up to date in an area, such as signing up for Google Alerts on a particular topic; and
6. Extracting: identifying the relevant information within each source.

In subsequent studies, Ellis (1993) found that these six strategies were used by all of the scientists he had interviewed, regardless of their particular field. Furthermore, he identified two additional strategies scientists use: verifying, in which they check that the information they have gathered is correct, and ending, in which they finish up their project.

In 1999, information behavior researcher T. D. Wilson developed a model displaying Ellis' six characteristics of scientists' information behavior, as shown in [Figure 12.4](#). Wilson emphasized, however, that the actual order in which scientists carry out these activities may vary and that these processes may involve iteration. This is why the lines between most of the stages (except verifying and ending) are not directional.



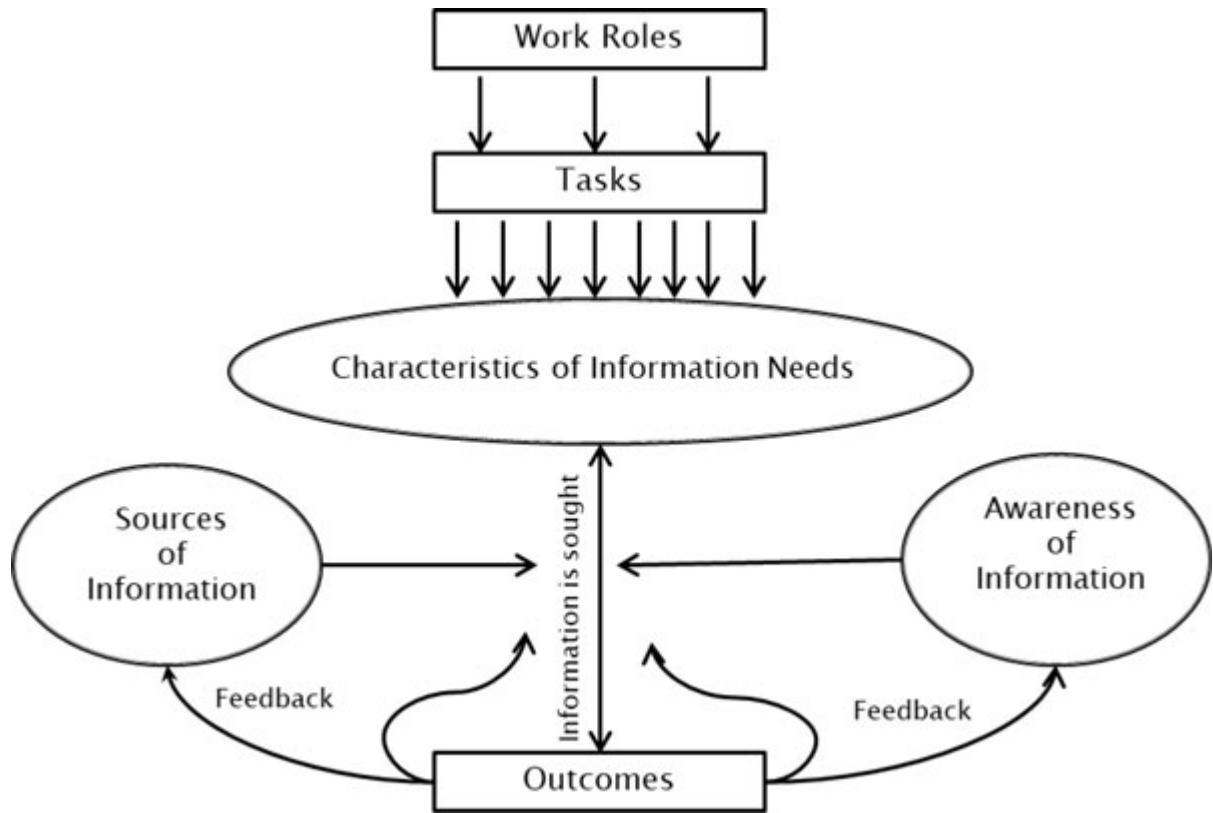
**Figure 12.4** A Stage Process Version of Ellis's Behavioral Framework (Wilson, 1999, p. 255)

## Work Context

The work context is another very common focus of information behavior models and theories. In this section, we'll look at Leckie, Pettigrew, and Sylvain's (1996) Model of the Information Seeking of Professionals, Byström and Järvelin's (1995) Information-Seeking Model, and Choo, Detlor, and Turnbull's (2000) Behavioral Modes and Moves of Information Seeking on the Web.

### *Leckie, Pettigrew, & Sylvain's (1996) Model of the Information Seeking of Professionals*

Drawing on earlier empirical studies of the information behavior of engineers, health-care professionals (including nurses, physicians, and dentists), and lawyers, Leckie, Pettigrew, and Sylvain (1996) developed their Model of the Information Seeking of Professionals (Figure 12.5). The model shows that professionals' information needs are prompted by their work roles and their particular tasks, which, in turn, are shaped by these work roles. It also shows that many different variables influence their information-seeking processes, including:



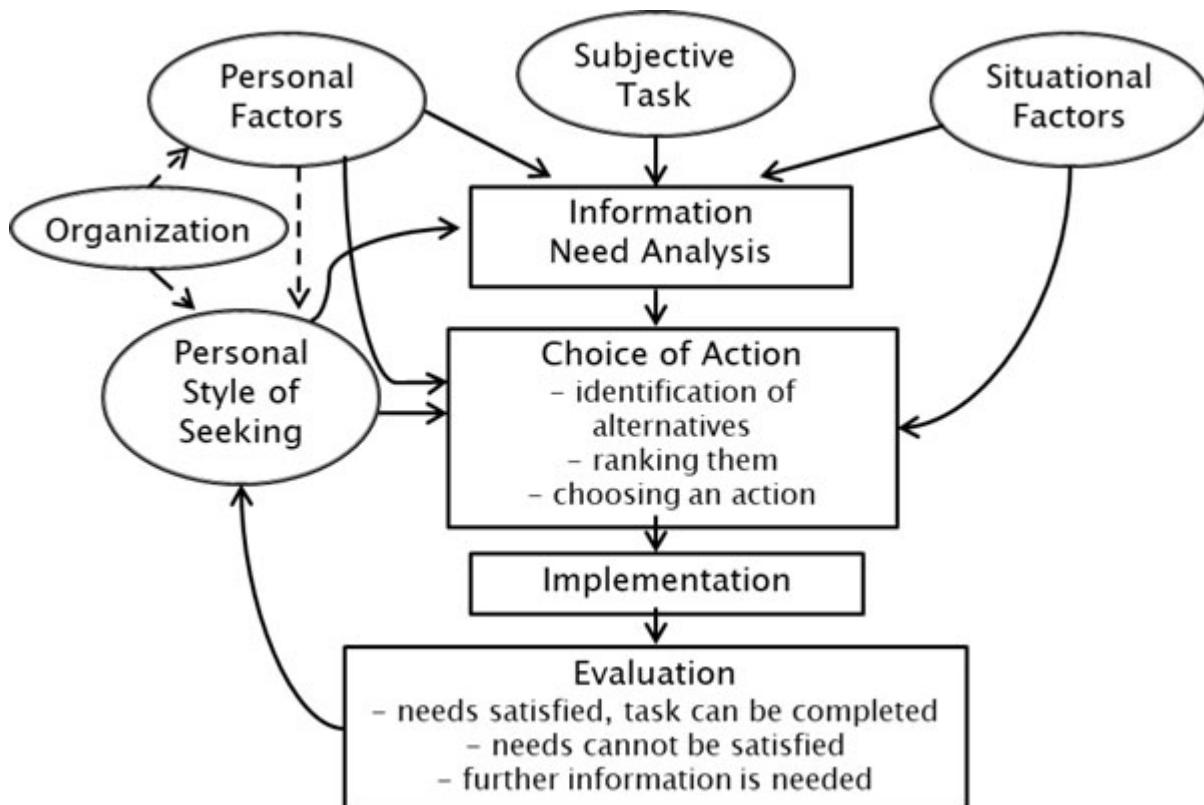
**Figure 12.5** Leckie, Pettigrew, and Sylvain's (1996) Model of the Information Seeking of Professionals (p. 180)

- the characteristics of their information needs;
- the types of information sources that they use;
- their direct or indirect knowledge (i.e., awareness of and prior success with) regarding available sources; and
- the perceived trustworthiness, quality, and accessibility of available sources.

The final component of Leckie et al.'s model outcomes indicates the possible results of information seeking, such as satisfaction of the professional's information need. However, Leckie et al. drew in feedback loops in order to show that professionals may need to continue their search for information and that their future searches (as well as their knowledge and perceptions of sources, and perhaps even the characteristics of their information needs) will be influenced by prior outcomes.

### *Byström and Järvelin's (1995) Information-Seeking Model*

Through questionnaires and diaries, Byström and Järvelin (1995) investigated the information needs of, and information sources consulted by, fourteen civil servants in Finland as they worked on various types of work-related tasks. Their Information-Seeking Model ([Figure 12.6](#)) shows that it is the worker's perception of their task that motivates them to analyze their need for information, select some type of information-seeking action, carry this action out, and then evaluate the results. Byström and Järvelin found that workers' information need analysis processes were influenced by not only their perceived task but also both personal and situational factors. Workers' choices of information-seeking action were influenced not only by their information need analysis but also by these personal and situational factors, as well as by the individual's own personal style of information seeking. The final step, evaluation, includes three possibilities:



**Figure 12.6** Byström and Järvelin's (1995) Information-Seeking Model (p. 197)

1. The worker's information need is satisfied and they can go on with their task;
2. The worker concludes that it is not possible to satisfy their information need; or
3. The worker needs to continue their search for information.

Similar to Leckie, Pettigrew, and Sylvain (1996), Byström and Järvelin incorporated feedback loops to show that workers may return to choosing and implementing an information-seeking action or even to the earlier information need analysis phase, depending on the results of the evaluation stage. These authors emphasize the relationship between task complexity and the complexity of the worker's information need, the number of sources they consult, and their likely success with seeking information. They point out that routine tasks are more likely to result in less complex information needs, fewer sources consulted, and greater likelihood of the worker succeeding in locating the information they need.

*Choo et al.'s (2000) Behavioral Modes and Moves of Information Seeking on the Web*

Drawing on their interviews with thirty-four knowledge workers (including IT specialists, managers, and research/marketing/consulting staff), as well as background questionnaires and logs of participants' Web-based activities, Choo, Detlor, and Turnbull (2000) developed a model to describe their information-seeking activities. The rows of their model ([Table 12.2](#)), Behavioral Modes and Moves of Information Seeking on the Web, shows that participants engaged in four types ("modes") of scanning (as identified earlier by Aguilar (1967) and Weick and Daft (1983)), including undirected viewing (looking at information with no specific information need in mind), conditioned viewing (looking at information with a focus on a particular topic and/or type of information), informal search (actively looking for specific information, but in an unstructured manner), and formal search (actively engaging in a very structured search for specific information). The columns of their model show that

participants engaged in six different types of information-seeking behaviors ([1] Starting, [2] Chaining, [3] Browsing, [4] Differentiating, [5] Monitoring, and [6] Extracting), as first identified by Ellis (1989b) and described more fully in the section on school/research-related information behavior models.

Each of the cells in Choo et al.'s (2000) model shows the specific information activities (or moves) that are likely to take place within each information behavior activity type, given the seeker's current information-seeking mode. For example, an individual who is just starting (column 1) their search for information and who is in "undirected viewing" mode (row 1) will likely be identifying particular websites where they might begin their search. In contrast, an individual who is looking through sources to obtain the most pertinent information ("extracting"; column 6) and who is in "formal search" mode (row 4) will likely use search engines to try to maximally hone their search for the most relevant information.

## **Everyday Life Context**

Relatively recently, models and theories about people's information behaviors within everyday contexts (that is, those pertaining to life pursuits other than school or work) have begun to appear. We will begin this section with Savolainen's (1995) broad model of Everyday Life Information Seeking (ELIS) and then look at Pettigrew's (1999) Information Ground model and Johnson's (1997) Comprehensive Model of Information Seeking (CMIS).

**Table 12.2. Choo, Detlor, and Turnbull's (2000) Behavioral Modes and Moves of Information Seeking on the Web**

	(1) Starting	(2) Chaining	(3) Browsing	(4) Differentiating	(5) Monitoring	(6) Extracting
(1) Undirected Viewing	Identifying, selecting, starting pages, sites	Following links on initial pages				
(2) Conditioned Viewing		Browsing entry pages, headings, site maps	Bookmarking, printing, copying Going directly to known site	Revising "favorite" or bookmarked sites for new information		
(3) Informal Search				Bookmarking, printing, copying Going directly to known site	Revisiting "favorite" or bookmarked sites for new information	Using (local) search engines to extract information
(4) Formal Search					Revisiting "favorite" or bookmarked sites for new information	Using search engines to extract information

### Savolainen's (1995) *Everyday Life Information Seeking (ELIS)* Model

Although studies of work-related information behavior are far more common, studies of people's nonwork information seeking began to appear in the 1970s. Savolainen (1995) introduced his Everyday Life Information Seeking (ELIS) Model ([Figure 12.7](#)) to help to guide future studies of people's information seeking outside of the context of their work. In constructing this model, Savolainen was informed by French sociologist Pierre Bourdieu's (1984) concept of habitus (that is, the relatively stable set of ways in which an individual tends to integrate their experiences and evaluate the various options available to them). Savolainen built his ELIS model around two central concepts:

# EVERYDAY LIFE

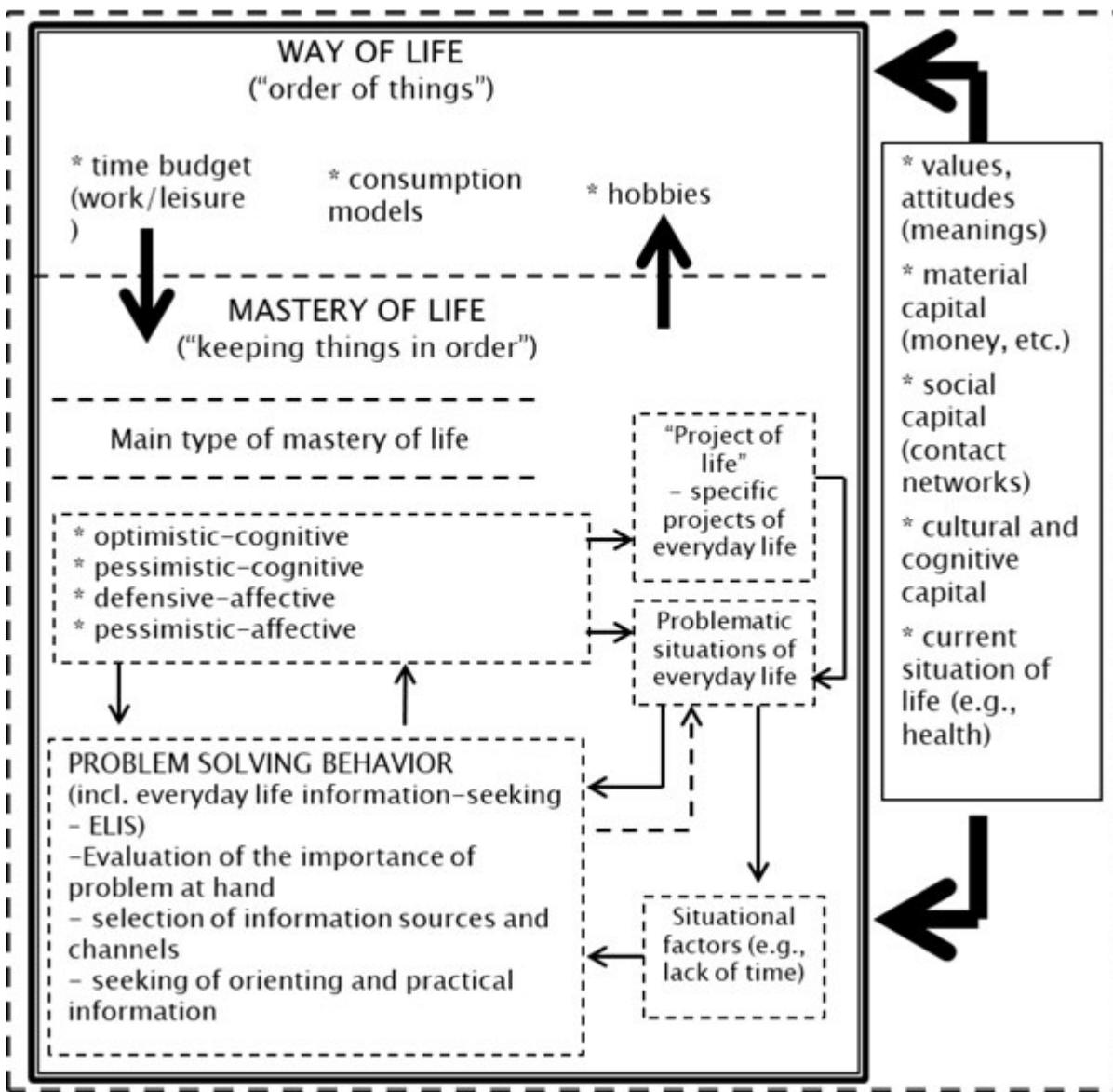


Figure 12.7 Savolainen's (1995) ELIS Model (p. 268)

- Way of Life: the individual's general dispositions (or habitus); and
- Mastery of Life: the ways in which the individual makes sense of and keeps order in their lives, including how they identify projects to work on, how they budget their time, and how they solve problems they encounter in their daily lives (such as by taking a more optimistic, cognitive approach or by taking a more defensive, affective approach).

Savolainen further describes many of the types of factors that influence an individual's Way of Life and Mastery of Life (see the rightmost box in [Figure 12.7](#)), including their values and attitudes; their cognitive, social, cultural, and financial capital; and their current situation in life (such as their current health status). Unlike most other information behavior models, Savolainen's ELIS model does not so much depict a causal process as portray a roadmap of areas that researchers should cover in an in-depth interview (Case & Given, 2016).

### *Pettigrew's (1999) Information Ground*

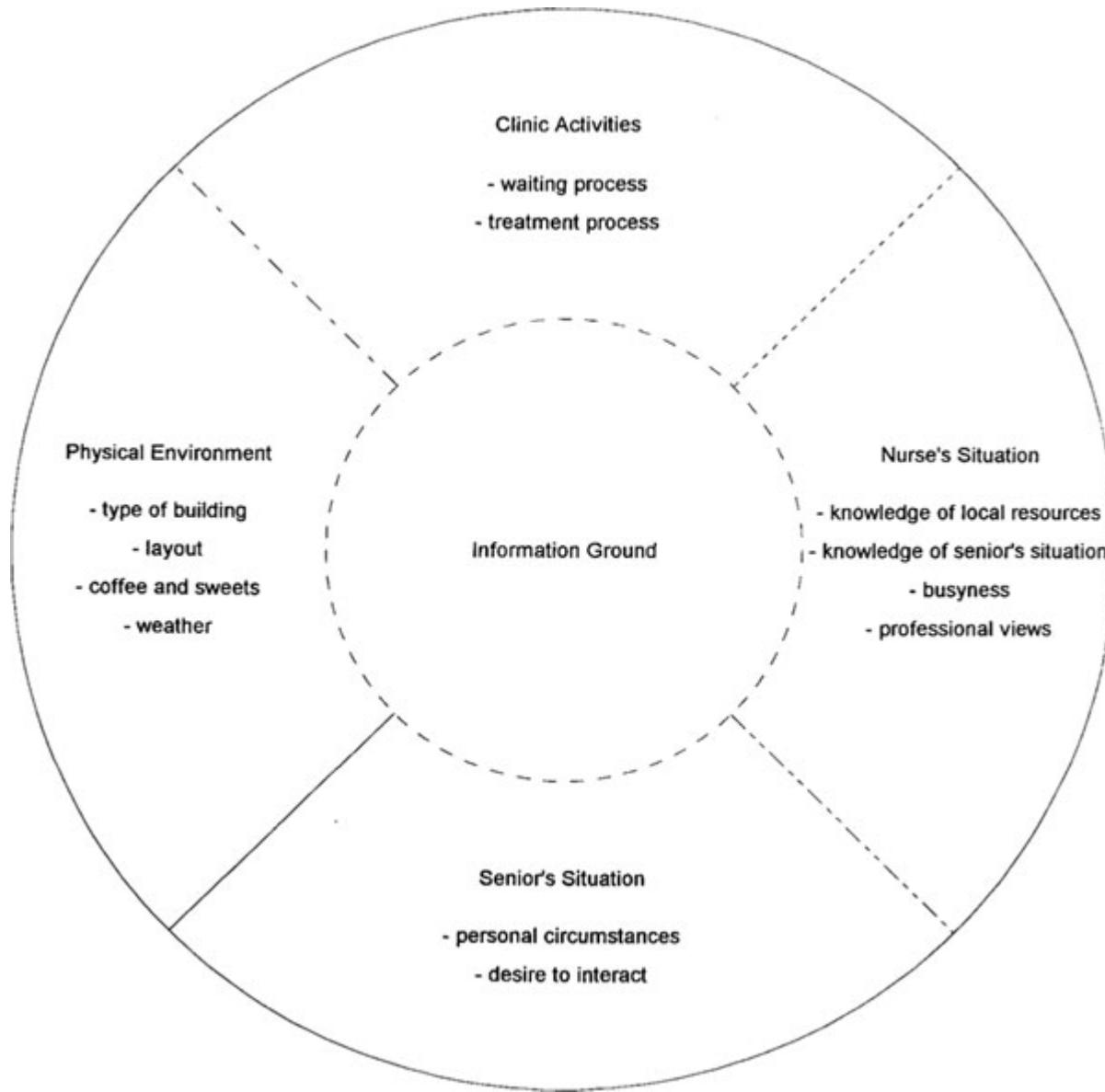
Information behavior researcher Karen Pettigrew (1999) conceptualized the idea of an "information ground" based on her findings from a field study she conducted at community-based foot clinics to identify how information about local services and programs flowed among nurses, elderly patients, and other clinic attendees. Through nonparticipant observation and in-depth interviews with seventeen nurses and twenty-four seniors, Pettigrew found that information flowed not just from nurse to senior, but also from senior to nurse, between nurses, and between seniors attending the clinic. She further identified four types of contextual factors that influenced her study participants' information behaviors: (1) physical environment (e.g., layout of the clinic; presence of hospital curtains), (2) clinic activities, (3) nurse's situation (e.g., professional views of their role as information provider, knowledge of local services available; willingness to get involved in the senior's situation); and (4) senior's situation (e.g., their ability to get help from family members and friends; how interested they were in interacting with nurses and other attendees).

Pettigrew (1999) found that these four types of contextual factors interacted to form what she termed a "grand context" or "information ground": "An environment temporarily created by the behaviour of people who have come together to perform a given task, but from which emerges a social atmosphere that fosters the spontaneous and serendipitous sharing of information" (p. 811). Pettigrew's information

ground model, including each of the four types of contextual factors previously described, is depicted in [Figure 12.8](#). Each of the four types of contextual factors (along with specific examples of each) is shown along the outer dimensions of the figure, showing the components that make up the information ground.

### *Johnson's (1997) Comprehensive Model of Information Seeking (CMIS)*

J. David Johnson, an information behavior researcher and long-term cancer survivor, developed the Comprehensive Model of Information Seeking (CMIS) to depict people's health-related information-seeking processes and the types of factors that influence these processes. His model ([Figure 12.9](#)), which has been tested with populations of patients who have cancer as well as within organizational contexts, consists of three major components:



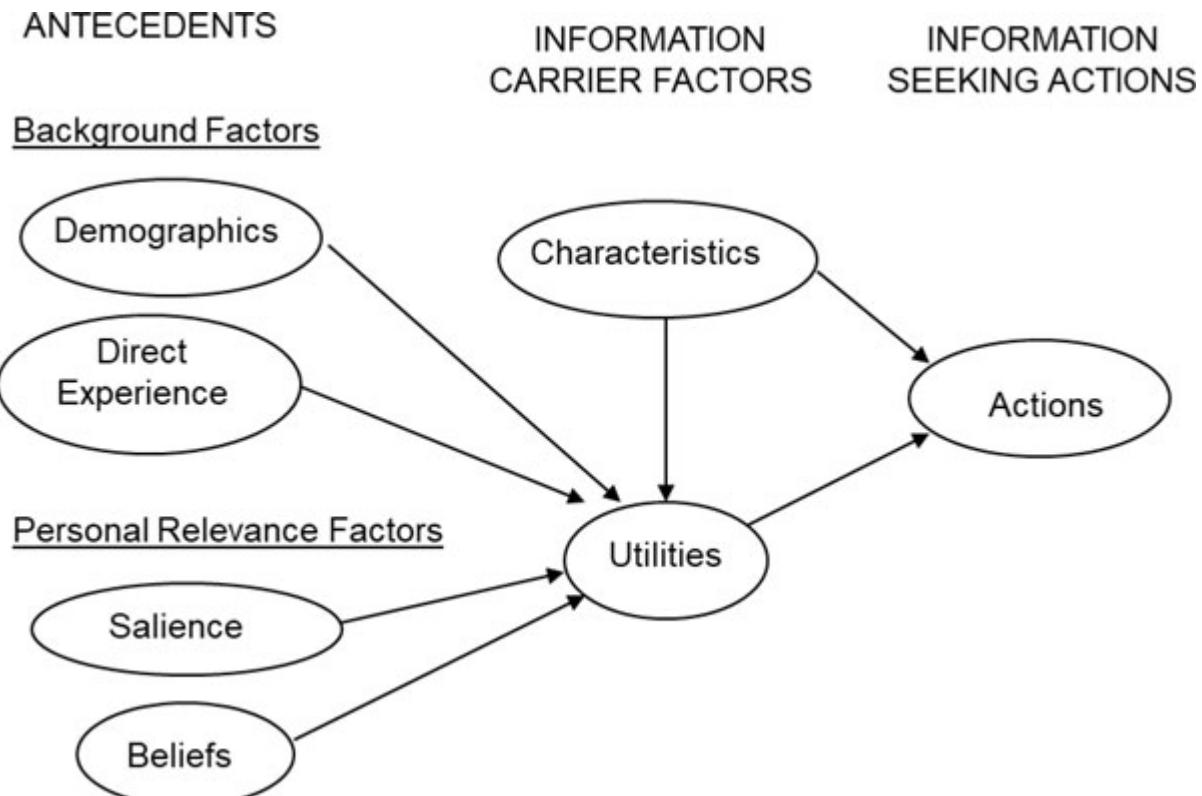
**Figure 12.8** Pettigrew's (1999) Information Ground (p. 813)

1. Antecedents;
2. Information carrier factors; and
3. Information-seeking actions.

The first component, antecedents, includes both background factors and personal relevance factors that drive (or do not drive) information seeking. Background factors encompass demographic characteristics of the information seeker (such as gender, age, race,

ethnicity, educational attainment, and socioeconomic status), as well as factors relating to their direct experience with the disease (cancer, in this case). Personal relevance factors encompass the salience of cancer to the individual (that is, how significant or applicable they perceive cancer-related information to be), as well as their cancer-related beliefs (such as their self-efficacy with regard to cancer; that is, their belief in their own ability to do something to prevent, manage, and/or reverse cancer).

Johnson's (1997) "information carrier factors" encompass both the characteristics and utilities of various channels of information, which shape the types of sources people turn to for information. The information carrier factor "characteristics" include editorial tone, which is comprised of perceived credibility, perceived intent of the source, perceived accuracy of the channel, and communication potential (i.e., the individual's perceptions regarding the comprehensibility and attractiveness of the channel). The second information carrier factor, utilities, relates to the individual's perceptions regarding the usefulness of various types of information channels.



**Figure 12.9** Johnson's (1997) Comprehensive Model of Information Seeking (CMIS) (p. 34)

The final component of Johnson's (1997) CMIS, "information-seeking actions," encompasses an array of different styles of information seeking, including active information seeking and information avoidance. The model shows that people's information-seeking actions are motivated by the antecedent factors and shaped by the information carrier factors. Antecedent factors may (or may not) motivate information-seeking behavior, and they also influence how actively the individual engages in information-seeking processes. Johnson emphasizes that, of all the antecedent variables, it is salience that "provides the underlying motive force to seek information" (p. 72).

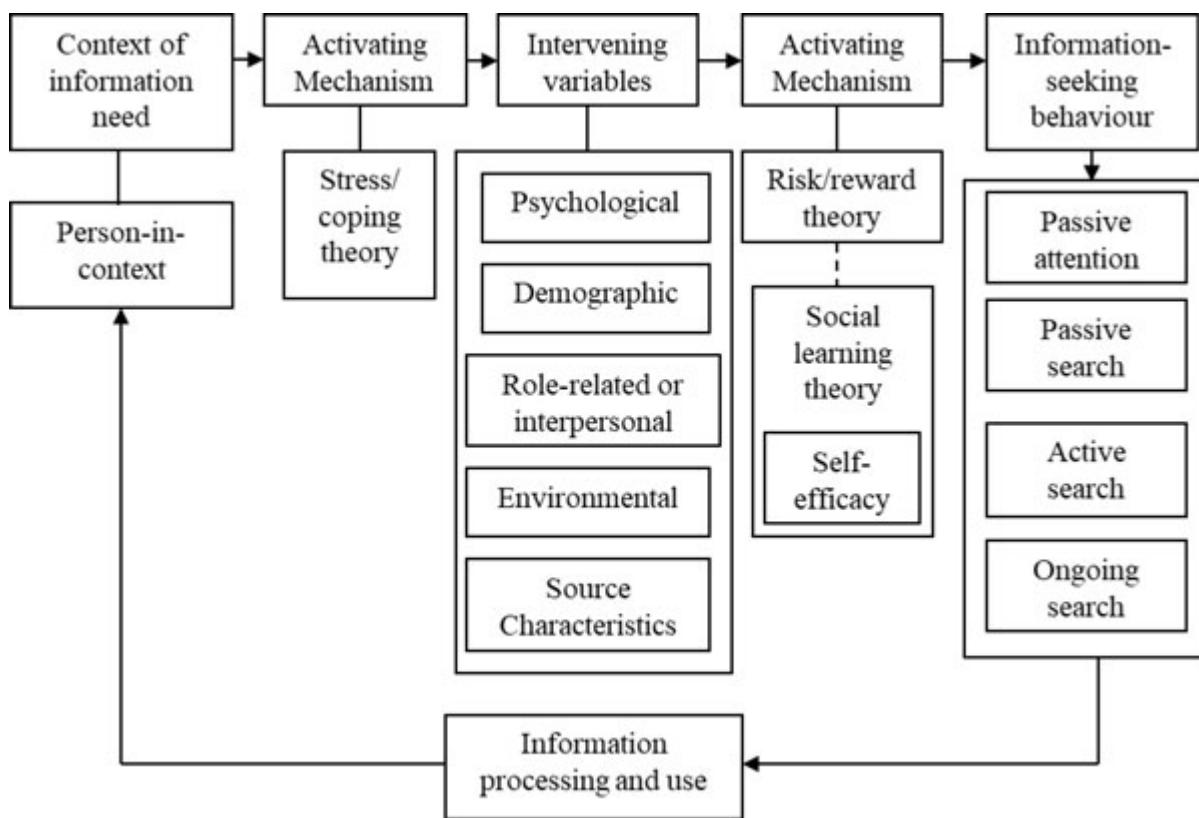
## Cross-Context

Some information behavior models and theories arise from studies originating in multiple contexts and/or are less specifically tailored for use in one particular context. In this section, we'll look at Wilson's (1997, 1999) 1996 Model of Information Behavior, Chatman's (1996) Theory of Information Poverty, and Dervin's (2003) Sense-Making.

### *Wilson's (1997, 1999) 1996 Model of Information Behavior*

Information behavior researcher T. D. Wilson has been actively involved in developing information behavior models for more than four decades. [Figure 12.10](#) depicts his 1996 Model of Information Behavior (Wilson, 1997, 1999). To construct his model, Wilson drew on many fields in addition to information science, including health communication, psychology, consumer research, decision making, and innovation. The main idea behind this model is that an individual in a particular context develops some information need and then proceeds, or is blocked from proceeding, to engage in one or more types of information-seeking behaviors. The individual then proceeds to process and use that information and then loops back again,

perhaps developing a revised or new information need within the same or a different context.



**Figure 12.10** Wilson's (1999) 1996 Model of Information Behavior (p. 257)

Within Wilson's 1996 Model (1997, 1999), the “activating mechanisms” reference three important theories from outside of the information science field, depicting some of the various factors that can motivate or impede an individual’s information seeking and use. For example, stress/coping theory helps to explain why some information needs may trigger information seeking, while others do not. If an individual in a particular context, such as someone who has just been diagnosed with cancer, feels unable to cope with this situation, they may not be motivated to undertake information seeking on the topic. Similarly, risk/reward theory can help to explain people’s selections of particular information sources (for example, looking for mental health information online may seem less risky due to the anonymity the Internet affords or consulting one’s physician for such

information may seem more likely to reward the individual with the most trustworthy information). The third theory mentioned by Wilson – social learning theory – and its central concept of self-efficacy further help to explain why someone may or may not seek information. If an individual believes that they cannot make a difference to their situation, they will be less likely to feel motivated to look for information that could prove helpful to them (as they don't believe it actually will help).

In addition to “activating mechanisms,” Wilson (1997, 1999) also mentions various classes of “intervening variables” that can serve as barriers to information seeking. Such intervening variables may include factors about the individual (including psychological, demographic, or role related); factors about the individual’s social relationships (“interpersonal”); factors about their context/situation (“environmental”); and characteristics of the sources they consider consulting or actually consult). Wilson (1997) emphasizes that, although these intervening variables are depicted at just one point in his model, they may actually intervene between other stages as well, including between the context of the individual’s information need and the activating mechanisms, between the activating mechanisms and information-seeking behavior, and between information-seeking behavior and information processing and use.

Wilson’s 1996 model (1997, 1999) describes four types of information-seeking behavior:

1. Passive attention;
2. Passive search;
3. Active search; and
4. Ongoing search.

Passive attention refers to activities in which an individual may acquire information without intentionally seeking it out, such as when you might glean information from a commercial while you’re watching a TV show. Passive search relates to serendipity (a concept we explored in [Chapter 4](#)). In an active search, the individual purposefully sets out to acquire information on a topic. An ongoing search

encompasses the various actions an individual takes to learn more and/or keep their knowledge on a topic up to date (Wilson, 1997).

Before iterating back to “person-in-context” within the model, an individual may (or may not) engage in information processing and use. Wilson (1997) describes information processing as incorporating information into one’s knowledge, beliefs, and/or values and information use as actual changes to the individual’s knowledge, behaviors, values, or beliefs that result from the information. Wilson emphasizes that information processing is subjective and not directly observable and that it is nearly identical to learning.

### *Chatman’s (1996) Theory of Information Poverty*

Drawing on her studies of the information behavior of three marginalized populations – women workers who were heads of their households and who were participating in a federally sponsored employment program (Chatman, 1983); janitorial workers at a southern university (Chatman, 1990, 1991); and older women living in a retirement community (Chatman, 1992) – information behavior researcher Elfreda Chatman found that the information seeking of some populations is thwarted by negative emotions (such as fear, hopelessness, and mistrust) and by a need to comply with social norms. For example, in her study of older women living in a retirement community, Chatman (1992) found that many of the women she interviewed were unwilling to share their true physical state (and thus, their actual information needs), as they could potentially be ejected from the retirement community if their care needs were perceived to be too great.

Chatman (1996) presented four concepts that “appear to act like a ‘DNA factor’ for information poverty” (p. 194):

1. Secrecy: concealing one’s true information need;
2. Deception: lying about one’s true information need;
3. Risk-taking: protecting oneself by not risking revealing one’s true information need; and

4. Situational relevance: believing that information relevant to one's situation exists but is not available to them, often due to an individual's unwillingness to make the effort and/or take the risk needed to get such information.

Chatman also identified three different levels of information relevance:

Level 1: general information that one needs for their everyday lives;

Level 2: information that is for a more personal need, but that one can ask for and still remain within generally accepted social norms; and

Level 3: information that is for a very personal need, and asking for such information could compromise one's independence and self-esteem.

Chatman pointed out that these levels of information need posed increasing levels of risk to the individual needing the information. At the third level of relevance, the individual has to take a great risk to try to get such information. As a result, Chatman pointed out that many individuals in her studies were unwilling to risk revealing information that would be necessary to reveal in order to obtain the most relevant information that could actually make a difference in their lives.

In addition to her four concepts of the Theory of Information Poverty, Chatman (1996) listed the following six propositional statements:

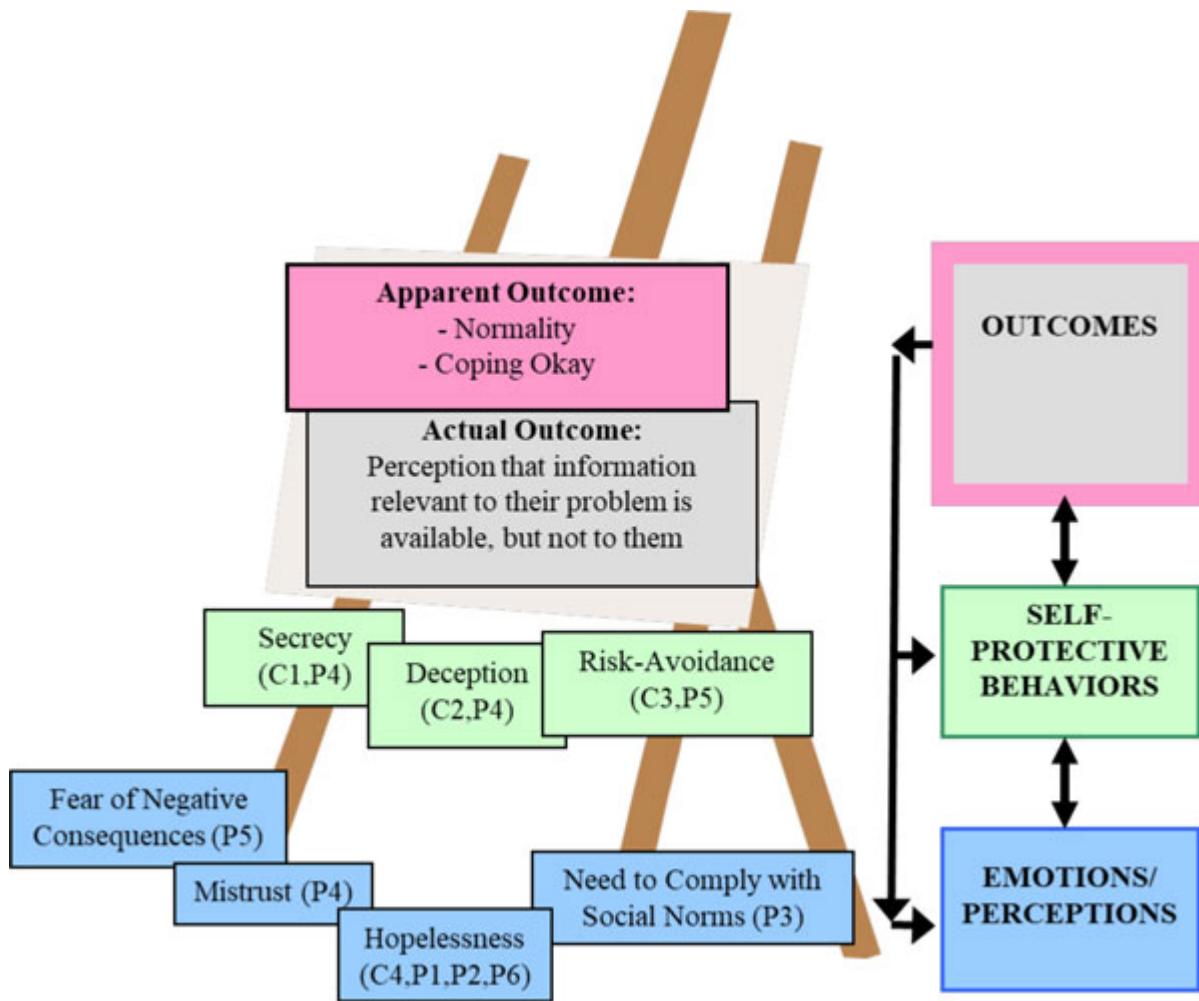
- Proposition 1: People who are defined as information poor perceive themselves to be devoid of any sources that might help them.
- Proposition 2: Information poverty is partially associated with class distinction. That is, the condition of information poverty is influenced by outsiders who withhold privileged access to information.

- Proposition 3: Information poverty is determined by self-protective behaviors that are used in response to social norms.
- Proposition 4: Both secrecy and deception are self-protecting mechanisms due to a sense of mistrust regarding the interest or ability of others to provide useful information.
- Proposition 5: A decision to risk exposure about our true problems is often not taken due to a perception that negative consequences outweigh benefits.
- Proposition 6: New knowledge will be selectively introduced into the information world of poor people. A condition that influences this process is the relevance of that information in response to everyday problems and concerns. (Chatman, 1996, 197–198)

Although there is no model of the Theory of Information Poverty, we have incorporated Chatman's four concepts and six propositional statements into a proposed model ([Figure 12.11](#)). The model depicts an easel to portray that the individual is painting a rosy picture, essentially saying, "I have the information I need and I am coping okay." However, the reality is just the opposite. Along the legs of the easel, we have placed her four concepts (C1–C4) and her six propositions (P1–P6). The model shows that people's negative emotions and perceptions (shown in blue) and their self-protective behaviors (shown in green) contribute to an outcome in which they do not have the information they need, they are not coping okay, and they perceive that information relevant to their situation is available but not to them due to the effort and/or risks they believe they would have to undertake to obtain this information. The end result is a maladaptive closed loop in which the individual's negative emotions, self-protective behaviors, and experienced, expected, and feared outcomes feed into one another. The individual may become trapped in a situation in which they are unwilling to risk revealing their true information needs and, thus, do not have the information (and the hope) that they need to be able to improve their situation.

*Dervin's (1992, 2003) Sense-Making*

Communications researcher Brenda Dervin (1992, 2003) has been working with colleagues on the development of sense-making since 1972. Sense-making, which is a theory as well as a set of methods and a body of findings, focuses on how people make sense of things within their everyday lives. The central assumption underlying sense-making is discontinuity and how constant discontinuity is to our experiences in our lives. To make sense of our worlds despite this discontinuity, people engage in two types of behaviors – gap-defining and gap-bridging. In gap-defining, a person perceives that they are unable to move forward because they cannot make sense of their situation. In gap-bridging, the person figures out how to make a new or different type of sense so they can cross the gap in their knowledge that they have identified and continue to move forward in their lives. Sense-making focuses on the ways in which people perceive and define these gaps; how they conceptualize, construct, and make use of bridges that enable them to cross these gaps; and how they continue on after crossing these bridges.



**Figure 12.11** A Proposed Model of Chatman's (1996) Theory of Information Poverty

Dervin's (2003) Sense-Making Metaphor is depicted in [Figure 12.12](#). As with Wilson's 1996 model, we begin with an individual in a particular situation encountering an information need (or a knowledge gap). The model then shows that the individual conceives of, constructs, and makes use of a bridge that enables them to make sense of their situation and to cross the gap that they've identified. The individual then experiences certain outcomes as a result of their gap-defining and gap-bridging behaviors and, ideally, is then able to carry on with their journey.

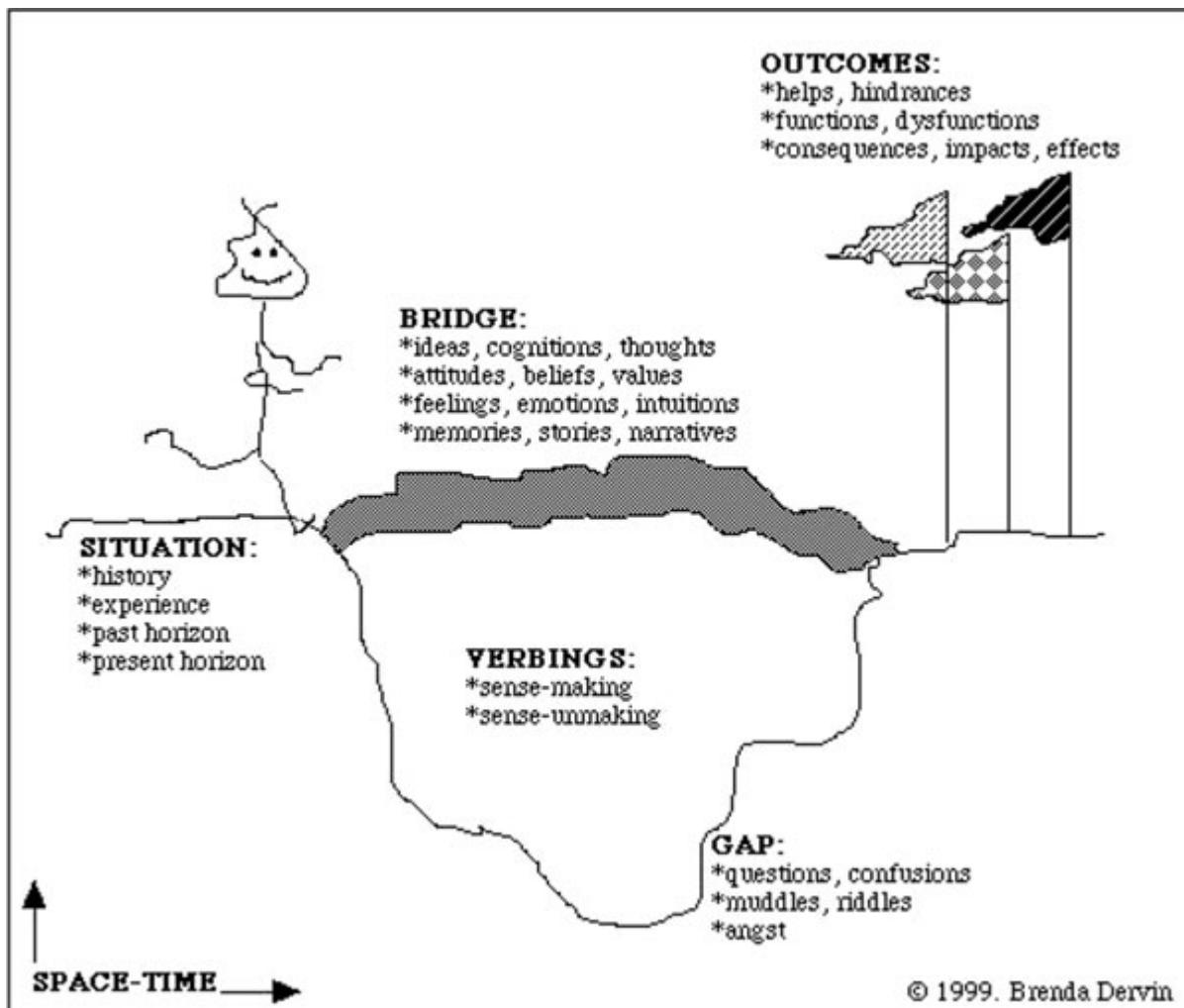


Figure 12.12 The Sense-Making Metaphor (Dervin, 1999)

## SAMPLE APPLICATIONS OF INFORMATION BEHAVIOR MODELS AND THEORIES

Information behavior models and theories have been applied for diverse purposes, such as helping to inform professional practice, guide future research studies and/or information system design, and motivate and inform future information behavior model/theory development. In this section, we will look at a few of the models and theories we've already discussed in this chapter, focusing on some of the ways in which they have been applied and/or built upon in the years since they were first introduced.

Kuhlthau's (2004) work on the ISP model has been very widely cited and applied to knowledge construction processes across multiple contexts, including adults completing work-related tasks (Byström & Hansen, 2005) and women seeking health information (Warner & Procaccino, 2004). Regarding specific applications, Kuhlthau's (2004) ISP model has been used to inform library instruction and reference services (e.g., Isbell & Kammerlocher, 1998), as well as to guide the design of information retrieval systems (Cole et al., 2000; Cole, 2001). In an investigation into the continued usefulness of this model, Kuhlthau, Heinström, and Todd (2008) found that it remains effective at explaining students' information behavior, helpful in designing information systems and services that are more user centered, and useful in informing teachers and librarians about guiding and helpfully intervening in students' inquiry projects.

Leckie, Pettigrew, and Sylvain's (1996) original article in which they first present their Model of the Information Seeking of Professionals has been cited nearly a thousand times. Some studies, such as Kwasitsu (2003) and Wilkinson (2001), have tested and refined their model with respect to the information behavior of some of the same populations (engineers and lawyers, respectively). Others have tested and/or extended Leckie et al.'s (1996) Model of the Information Seeking of Professionals with other populations, including software engineers (Freund, 2015), information security professionals (Ohtoshi & Gottschalg-Duque, 2018), and health educators (Hicks, 2009).

Johnson's (1997) Comprehensive Model of Information Seeking (CMIS) has been empirically tested within both cancer (Johnson, 1993; Johnson & Meischke, 1993) and organizational contexts (Johnson, Donohue, Atkin, & Johnson, 1995). Reviews and applications of the CMIS have appeared in the literatures of several different fields, including information science, communication, and health (Johnson & Case, 2012). In addition, the CMIS has also been tested in studies of health communication funded by the US National Institutes for Health (NIH) (Case & Given, 2016). In a recent study, Ruppel (2016) confirmed many aspects of the CMIS and extended the model to incorporate health information scanning – a common

type of health-related information behavior (particularly via mass media) that involves incidental information acquisition. Although health information scanning is less active and purposeful than the much more commonly studied information behavior of information seeking, it is an important type of information behavior to consider as it has been found to be very common (actually more common than information seeking) to be associated with greater cancer-related knowledge, and to influence people's health-related decisions (Niederdeppe et al., 2007; Shim, Kelly, & Hornik, 2006).

Dervin's (2004) work on sense-making has been very widely cited, particularly by researchers seeking methodological guidance in studying information and communication system users and audiences. Additionally, a large number of researchers have drawn on Dervin's work to establish a theoretical basis for their research. These researchers have spanned numerous fields, including library and information science, communications, nursing, medicine, counseling, religious studies, museum studies, journalism, public education campaigns, technology studies, psychology, social work, and political science (Agarwal, 2012). Over the past five decades, Dervin's work has had profound influences on information behavior research, as well as on information professional practice.

As demonstrated in these examples, information behavior models and theories have many important applications, including guiding and informing the practices of information professionals (such as librarians, information managers, systems designers, usability specialists, and webmasters) as well as the work of researchers in information behavior and many other related fields.

## DISCUSSION QUESTIONS

- Think back to a recent time when you had a fairly complex need for information that required you to engage in a series of information-seeking steps in order to satisfy that need. Sketch a model of the steps that you took as you identified your information need, decided which sources to consult, accessed

those sources, evaluated the information you found, and perhaps adapted and used that information to achieve some goal you had.

- Select a model or theory from this chapter and discuss its strengths and weaknesses, as well as some potential ways in which the model or theory might be adapted and/or used for some particular purpose, such as better assisting a particular user group with their information needs, better designing an information technology to support the information-seeking processes of a particular user group, etc.
- Thinking about the information science career you're planning to pursue, do you think that you might benefit from developing and/or consulting theories and/or models such as those discussed and depicted in this chapter? Why or why not? How might they prove useful (or why do you feel they will not be useful to you in your career)?

**Learning Activity:** Reread the opening paragraphs about Professor Reyes' model and theory of City Community College students' information behaviors while completing a research assignment. What are some potential applications of her model and theory? How might you use this information in order to better help these students with their information needs? For example, what information would you pass on to a fellow librarian who is trying to assist these students? What information resources might you develop to better support these students? What information technologies might you design that could better facilitate their research processes?

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# 13

## *Consumer Health Information Behavior and Health Justice*

*Dave Dryden, a 72-year-old retired taxi driver struggling to make ends meet on his Social Security income of just less than \$700 per month, suddenly began to experience some numbness in his fingers and toes. Figuring his symptoms were likely due to having overdone it at the city's parks and recreation gym last week when he visited for the first time in years, Dave ignored them for a few weeks and, to be honest, he preferred not to encounter any information on this topic during this time. When the symptoms not only did not disappear but actually began to intensify the following month, Dave realized he should probably go to a doctor; however, he hadn't been to a doctor in years, so he didn't know who he could go to. Additionally, he knew that his only health insurance – Medicare – placed many restrictions on what they would cover, and he was likely to be left with a large bill that he would somehow have to pay for himself. Although he had used the Internet in the past to email, use Facebook, and to look up an occasional phone number, Dave*

*had never looked for health information online before. Thinking that he might be able to avoid a large doctor bill, he went to Google and typed “numb fingers toes.” Clicking on the top result, he learned about a home remedy that other users had written in about, saying that it had helped them with exactly these same symptoms. Dave ordered the powder for \$65 and decided to hold off on going to the doctor until he had a chance to receive it and try it out for a week. Three days later, Dave woke up in the hospital. A doctor came into his room and explained that he had developed type 2 diabetes and that his very high blood glucose levels had brought on a stroke. The doctor told him that his prognosis was good, but that he would have to visit several kinds of health-care providers regularly (including an endocrinologist and a dietitian) and make some major changes to his diet and exercise habits. Although the doctor provided him with specific instructions, Dave quickly realized that he would be unable to act on most of them, because the foods and services he needed were out of his reach for a whole host of reasons, including a lack of money, inadequate health insurance, and very limited access to transportation.*

*Norma Medina, a 74-year-old retired CIO (chief information officer) of a large business application software company, suddenly began to experience some numbness in her fingers and toes. At first, she thought maybe her symptoms were due to having overdone it at her private gym last week. When her symptoms did not improve over the next few days, she called her good friend Ella, a very experienced oral surgeon. After listening to Norma describe her symptoms, Ella told her that it sounded to her like she might have neuropathy, which is commonly linked with having diabetes. She told Norma that she would call her close friend Reynaldo, a very well-regarded endocrinologist, and ask him to see Norma as soon as possible. Norma was able to get an appointment with Reynaldo the following week, and her bill was covered in full between Medicare and her Medicare Supplement Insurance Plan. Norma had purchased this supplement plan upon her retirement from her*

*company. Although it was quite expensive (\$550 per month), Norma felt it was a good investment because she realized that Medicare had quite a few limitations as to what they were willing to cover. The doctor, Dr. Reynaldo Reyes, diagnosed her with type 2 diabetes and provided her with specific instructions as to how to get her blood sugars under control. Norma was able to follow the majority of these instructions with no problem, and she turned to the Internet, always her tool of choice when she had any type of information need, to learn more about neuropathy, diabetes, and tips for successfully managing this disease. Typing “diabetes neuropathy” into Google, Norma carefully scanned the results list to pick out the websites that featured information that was provided, or at least vetted, by licensed medical doctors. Acting on the information provided to her by her doctor and what she had learned in the course of her Internet research, Norma was able to bring her blood glucose levels down to normal range within just a few months and was quickly able to completely get rid of the neuropathy she had been experiencing.*

\* \* \*

Both of these stories describe various types of consumer health information behavior. Consumer health information behavior encompasses people's health-related information needs, as well as the activities in which they engage (or do not engage) in order to look for, manage, share, and make use of this information. Although Dave initially put off looking for information on his symptoms and even preferred to avoid information about them (remember our earlier discussion about information avoidance in [Chapter 2](#)?), Norma immediately called a good friend who was a medical professional so she could ask questions about the symptoms she was experiencing. As a next step, both Dave and Norma went online to try to find information about their symptoms. Dave, who had no experience using the Internet to look for health information, ended up clicking on an ad at the top of the search results list and purchasing a home

remedy. Norma, a much more experienced Internet user, turned to the Internet already armed with some keywords supplied by both her friend and her doctor. She carefully picked through her search results list and clicked on the sites where the information was provided by, or at least vetted by, licensed medical doctors. Eventually, Dave learned about the meaning of his symptoms when something potentially catastrophic happened – he had a stroke. In contrast, Norma was able to head off such a catastrophe, proactively learning about and engaging in the health behaviors that were necessary to bring her blood sugar levels down into the normal range.

These stories are not just about consumer health information behavior. They are also about the very important and intertwined concept of “health justice.” Health justice is about both the recognition and fulfillment of every individual’s moral entitlement to a sufficient and equitable capability to be healthy (Venkatapuram, 2011). Do you believe that Dave and Norma had equitable capabilities (that is, *fair* ones – though their specific capabilities may not be exactly the same) to deal with their situation? Throughout both of these stories (particularly in comparison to one another) there are numerous markers of health injustice (that is, a lack of equity between individuals [or entire populations]) as to their capability to be healthy. Can you spot them?

In this chapter, we will discuss these two very important and interrelated topics – consumer health information behavior and health justice. We open the chapter with a closer look into the definition and the various facets that comprise consumer health information behavior; the central importance of consumer health information behavior in influencing people’s health trajectories and outcomes; people’s varying preferences and strategies with regard to health information; the significant challenges that can arise within the various processes encompassed within consumer health information behavior; and the numerous types of factors that can motivate, demotivate, or impede people’s health-related information seeking and use. In the second section of the chapter, we move to the crucially important and interrelated topic of health justice, delving

deeper into the definition of this term; exploring the extent to which it exists (or not) in the United States and around the world and the specific populations that tend to experience health injustice; and discussing ways in which information professionals of all types can help to move us closer toward health justice. In a final section of the chapter, we will look at three studies that sit at this important intersection of consumer health information behavior and health justice.

## **CONSUMER HEALTH INFORMATION BEHAVIOR**

Consumer health information behavior encompasses a person's information needs as well as the activities they engage in (or not) to identify and articulate an information need, to find the information they require, to assess the information they find or come across, to collect and manage the information they find, and to make use of this information to maintain and/or improve their health. A person's health-related information behaviors can have profound consequences for their health trajectory (how their health status unfolds over time), their quality of life, their potential health outcomes, and the health outcomes that eventually do, in fact, unfold for them. As Johnson (2014) explained, "The scope and nature of the information on which to base [health-related] judgments, the repertoire of alternative courses of action known to the searcher, and ultimately the action taken are affected by individuals' information-seeking behaviors" (p. 709). In turn, an individual's health-related decisions and the actions they do (or do not) take to maintain or improve their health exert a profound influence on their health outcomes.

### **Health Information- and Decision-Related Preferences**

Information can play an important role in enabling someone (such as Dave or Norma) to cope with an illness; however, people's information-related preferences and strategies in this regard differ. Though some people (like Norma) actively engage in information seeking, aiming to reduce their uncertainty, others (like Dave) prefer

to avoid information, hoping to maintain (or sometimes even increase) their uncertainty. Although studies have generally found the former to be a more common approach, the latter is not at all uncommon. In fact, one recent study (St. Jean, Jindal, & Liao, 2017) found that nearly one-third ( $n = 1,109$ ; 31.3 percent) of the 3,541 US adults surveyed said that they would rather not know their chance of getting cancer. In another study, Hack, Degner, and Dyck (1994) similarly found that more than half of their study participants (women who had breast cancer) preferred that their doctors tell them the best possible diagnosis, rather than the most likely outcome for them. However, information avoidance has been found to correlate with a wide array of negative outcomes, such as:

- being offered less information by one's doctor (Brashers, Goldsmith, & Hsieh, 2002);
- being unable to fully participate in making decisions related to one's treatment (Degner et al., 1997; Hack et al., 1994); and/or
- being treated paternalistically by one's doctor, feeling forced to make hasty decisions, and ultimately questioning and sometimes regretting one's treatment-related decisions made under these conditions (Clark, 2005).

Researchers have also found that people vary as to how active they would like to be in terms of making decisions related to their own treatment. Although some people prefer to actively seek information and participate in making these decisions along with their doctors, others prefer to take a more passive approach, relying on their doctor's expertise rather than trying to find and understand information for themselves. Researchers have found that the latter approach is much more common among people who are disadvantaged in one or more ways, such as those who are working class (Clark, 2005), less well educated (Degner & Sloan, 1992; Ehemann et al., 2009; Hack et al., 1994), older (Bilodeau & Degner, 1996; Degner & Sloan, 1992; Ehemann et al., 2009; Mills & Davidson, 2002), and sicker (Butow, Maclean, Dunn, & Tattersall, 1997; Degner & Sloan, 1992; Ehemann et al., 2009).

Many of the disadvantage-related factors found to be associated with a preference for a more passive approach to health-related information seeking and increased reliance on one's doctor's expertise line up with the correlates of information avoidance identified in the previously mentioned study recently conducted by St. Jean, Jindal, and Liao (2017). St. Jean and her colleagues found that the US adult survey respondents who agreed with the statement "I'd rather not know my chance of getting cancer" were statistically significantly more likely to be older, less well educated, and have lower household incomes. However, these researchers identified many additional disadvantage-related correlates, as well. Participants who preferred not to know their chances of getting cancer were also:

- less likely to report that they seek out health information;
- less likely to say that they use the Internet;
- more likely to indicate that they had encountered difficulties when they had looked for cancer-related information;
- more likely to report lower health- and information-related self-efficacy;
- more likely to say that they didn't have anyone they could count on for emotional support; and
- more likely to say that they didn't have a particular health-care provider that they go to see most often.

## **Consumer Health Information Behavior Challenges**

As with information behavior more generally, health-related information seeking may be prompted when an individual becomes aware that they (and/or someone close to them) have an information need. People may never develop this awareness, however, or they may not do so until a point in time later than when information could have been the most useful (remember Dave's story?). When someone (such as Dave and Norma) experiences symptoms, they may not recognize that they mean anything. If the individual has an information need that they are unaware of, they are very unlikely to go out seeking information on the topic. In addition, they are very

unlikely to be able to recognize information as relevant and as something that they need, should they happen to serendipitously come across it. Thus, one of the first (and perhaps most difficult to overcome) challenges people may encounter in relation to consumer health information behavior is incognizance – a lack of awareness that one has a particular information need. Health literacy (previously covered in [Chapter 5](#)) is a fundamental requirement for being able to develop this awareness.

Realization of an information need is only the first step, though; you must also be able to identify and articulate that need in order to begin a search for information. Barriers that may impede people at this point include insufficient health literacy, lack of awareness of potential sources of trustworthy health information, lack of convenient access to such sources, lack of knowledge regarding how to use these sources, and an inability to understand and assess the personal relevance, credibility, and potential usefulness of the information they find.

The transition between information seeking and use, if it occurs at all, is frequently fraught with potential challenges, as well. Again, a sufficient level of health literacy is crucial to this aspect of the consumer health information behavior process. In order to make use of information – whether that means to increase one's knowledge, to make a decision, to solve some problem, or something else – an individual needs to be able to understand it, adapt it for their own personal circumstances, and be able (intellectually, physically, financially) to take action based on it. Although health information is frequently packaged as one-size-fits-all, whether it's distributed by health-care providers or available freely on the Internet, the same information is likely to be actionable for some people but not others. Information use (or nonuse) profoundly influences an individual's health trajectory, the quality of life that it is possible for them to achieve, the health outcomes that are within their reach, and the health outcomes that they eventually do experience.

## **Factors Motivating, Demotivating, or Impeding Health-Related Information Seeking and Use**

Many researchers have conducted studies to identify the different types of factors that can motivate, demotivate, or impede people's health information seeking and use. For example, in a longitudinal, mixed-methods study with thirty-two adults who have type 2 diabetes, St. Jean (2012) identified physical, social, cognitive, and affective motivating, demotivating, and impeding factors (summarized in [Table 13.1](#)).

**Table 13.1. Factors Motivating, Demotivating, and Impeding Diabetes-Related Information Seeking and Use (St. Jean, 2012)**

Motivating Factors	<ul style="list-style-type: none"><li>• Concerns about current physical state (e.g., being diagnosed; experiencing symptoms)</li><li>• Feared future physical state (e.g., diabetes-related complications; death)</li><li>• Desired future physical state (e.g., get rid of diabetes; get off medication; improve one's health and/or quality of life)</li><li>• Watching or hearing about the experiences of other people with diabetes (e.g., people experiencing complications or people who are successfully managing their diabetes). [Some researchers (e.g., Kutner et al., 1999) call this personal experience-based type of information about what it's like to live with a particular illness "illness-related information," distinguishing it from "disease-related information" (information about diagnosis, prognosis, and treatment) that one usually gets from their doctor.]</li><li>• Receiving social support (e.g., respect and positive reinforcement from one's doctor; encouragement from important people in one's life)</li><li>• Desire to learn to manage diabetes so that one would be there for other people (e.g., one's children or grandchildren)</li><li>• Wanting to help other people who have diabetes or who are at risk of developing diabetes</li><li>• Desire to feel in control of their diabetes</li><li>• Desire to decrease feelings of anxiety or uncertainty</li><li>• Desire to meet the challenge of managing diabetes, realizing that it's up to them to manage their diabetes</li><li>• Desire to keep up to date with any new developments</li><li>• Desire to educate themselves, often in order to prepare for or follow up on a doctor appointment</li><li>• Need to confirm information</li><li>• Increased information seeking due to ready accessibility of information within people's everyday life contexts</li></ul>
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Demotivating Factors	<ul style="list-style-type: none"> <li>• Unconcern due to absence of physical symptoms (thus, no impetus to look for diabetes-related information)</li> <li>• Overwhelm due to seemingly uncontrollable physical symptoms (thus, no desire to look for diabetes-related information)</li> <li>• Stigma (e.g., feeling blamed by society for developing diabetes; feeling ashamed of having diabetes)</li> <li>• Lack of constructive social support (e.g., family members offering only foods participant cannot eat; support group meetings experienced as scary and depressing)</li> <li>• Denial/wish that diabetes would go away</li> <li>• Fear (e.g., fear engendered by hearing about diabetes-related complications)</li> <li>• Depression</li> <li>• Anger (e.g., anger at doctor; anger at being diagnosed with diabetes)</li> <li>• Attitudes toward behaviors necessary to manage diabetes (e.g., not wanting to change one's eating habits)</li> </ul>
Impeding Factors	<ul style="list-style-type: none"> <li>• Barriers posed by physical problems (e.g., physical disabilities, such as vision impairment or severe neuropathy; comorbidities)</li> <li>• Barriers posed by lack of resources (e.g., money; transportation; health insurance; computer/Internet access)</li> <li>• Lack of time to devote to managing diabetes</li> <li>• Problems getting doctor appointments (e.g., can't see the doctor one wants to see; can't get an appointment with him/her soon enough)</li> <li>• Feeling treated by doctors in unacceptable ways (e.g., doctors not spending enough time with them; doctors not listening to them; doctors not providing sufficient explanation; doctors providing cookie-cutter treatment; doctors behaving in an authoritarian manner toward them; doctors neglecting to follow up with them after appointments)</li> <li>• Being told by doctors or other people in their lives that they had to do something</li> <li>• Emotionality</li> <li>• Specific emotional reactions (e.g., stress; fear; worry; depression; overwhelm)</li> <li>• Experiencing incognizance (i.e., not being aware of one's information need(s); not knowing that one doesn't know something that one needs to know)</li> <li>• Being unaware of potential sources of diabetes-related information</li> <li>• Barriers posed by cognitive limitations and information overload (e.g., forgetting to ask doctors the questions one had thought of; inability to remember everything)</li> <li>• Difficulties navigating through complex information (e.g., problems with getting government benefits; difficulties navigating the Internet or specific websites)</li> <li>• Need to wade through advertisements (especially when they're interleaved within legitimate sources of information)</li> <li>• Encountering misinformation (e.g., biased information; outdated information)</li> </ul>

- Feeling distrustful toward the government and/or doctors
- Perceived lack of relevant information (e.g., not seeing the relevance when a family member or spouse had previously been diagnosed with diabetes; not being able to determine relevance unless one reads an entire document; relevant information was not provided in a conducive situation or at the right time; what is relevant to an individual changes over time)
- Lack of prioritization of diabetes management

All of these different factors ([Table 13.1](#)) that can motivate, demotivate, or impede an individual's health-related information seeking and use vary from individual to individual. These factors are fundamentally rooted in the person's situation, as well as the broader context in which they live their lives and in which their information behaviors unfold. Although some people have ample access to important resources, such as transportation, health insurance, and access to information, others do not. Health disparities largely result from such "social determinants of health," defined by the World Health Organization (WHO, 2011) as "the conditions in which persons are born, grow, live, work and age" (p. 2). This brings up the very important topic of health justice, which underscores the moral right of every individual to an equitable and sufficient capability to be healthy.

## **HEALTH JUSTICE**

The concept of health justice pertains to the fair distribution of resources and opportunities such that everyone has a fair shot at being able to live a long and healthy life. Dr. Martin Luther King Jr., an early proponent of health justice in the United States, stated more than 50 years ago (in 1966): "Of all the forms of inequality, injustice in health is the most shocking and the most inhuman because it often results in physical death" (Galarneau, 2018). A couple of decades earlier, the World Health Organization (WHO) wrote in its 1946 Constitution: "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition" (p. 1). More recently, Venkatapuram (2011) has defined

health justice as the moral entitlement of every individual to a sufficient and equitable capability to be healthy.

However we define health justice, we cannot achieve it without a fair distribution of resources and opportunities, particularly information. The WHO (2017) specifically mentions information as one of the underlying determinants of health, and the United Nations Committee on Economic, Social and Cultural Rights (CESCR) (2000) has listed information among the four essential elements of the right to health. The CESCR further highlights the central importance of information access, defining this as “the right to seek, receive and impart information and ideas concerning health issues” (p. 4). Without both physical access (i.e., Can I obtain the information I need?) and intellectual access (Can I understand the information I find?) to information, one will not have a sufficient and equitable capability to be healthy.

## **Does Health Justice Exist?**

Unfortunately, health justice remains just a distant goal, both within the United States and around the globe (Lee et al., 2015; Ruger, 2004; World Health Organization, 2011). Individuals and populations who experience various forms of social injustice, such as poverty, limited education, and inadequate health insurance, along with the limited access to resources and opportunities that tend to accompany these injustices, are more likely to become ill, to get injured, and to die prematurely (Levy & Sidel, 2013).

One way that we might measure progress toward health justice is to measure differences in life expectancy. Research has shown that US residents who are wealthier, more educated, and white live, on average, 10 to 15 years longer than people who are not similarly advantaged. One such study (Chetty et al., 2016) found that 40-year-old men who fall into the top 1 percent income bracket live, on average, 15 years longer than 40-year-old men in the bottom 1 percent income bracket (87.3 versus 72.7 years). Their findings were similar for 40-year-old women. Women in the top 1 percent income

bracket live, on average, 10 years longer than those in the bottom 1 percent income bracket (88.9 versus 78.8 years).

Another study (Olshansky et al., 2012) found similar differences in life expectancy based on people's educational attainment and race. These researchers found that white Americans who have completed at least 16 years of education (such as earning a bachelor's degree) by the time they are 25 years old live, on average, 10.3 (for females) to 14.2 (for males) years longer than African Americans who have completed less than 12 years of education by the age of 25. Even more alarming than these findings of gross inequities in life expectancy is the finding by both Chetty et al. (2016) and Olshansky et al. (2012) that these gaps have only continued to grow over time.

## **Roles of Information Professionals in Achieving Health Justice**

Information professionals of all types have tremendous potential to play leading roles in helping us to move closer to health justice. Information is a necessary currency to ensure that every individual has a fair shot at being able to live a long and healthy life. Information professionals routinely play instrumental roles in the distribution of this currency and in enabling people to access and benefit from it. Librarians, for example, help people to become aware of and able to take advantage of opportunities in their lives. Data analysts help people to derive important meaning and useful insights from large stores of data. User experience (UX) designers and usability testers help to ensure that people can easily make use of information systems and maximally benefit from their use. Information professionals, as a whole, facilitate people's physical and intellectual access to information and help to dismantle barriers that can keep people from effectively and efficiently finding and understanding the information that they need and using it to improve their lives. Thus, information professionals of all types are well equipped and perfectly positioned to help to move our society closer to health justice.

## **THREE SAMPLE STUDIES AT THE INTERSECTION OF CONSUMER HEALTH INFORMATION BEHAVIOR AND HEALTH JUSTICE**

In this final section of this chapter, we'll take a look at three consumer health information behavior studies that importantly intersect with the concept of health justice. The first study (Clark, 2005) investigated the information behaviors of women in breast cancer support groups, comparing the information-seeking strategies of women who belonged to a working-class support group with those of women who belonged to a middle-class support group. In the second study, Jung, Ramanadhan, and Viswanath (2013) investigated the connection between social determinants of health (i.e., socioeconomic status and race/ethnicity) and health disparities, particularly aiming to determine whether health information seeking/avoidance mediates (that is, helps to explain) this relationship. In the third study, Bennett, Chen, Soroui, and White (2009) investigated whether health literacy mediates the relationship between social determinants of health (i.e., race/ethnicity and educational attainment), on the one hand, and self-rated health status and engagement in preventive health behaviors, on the other.

### *Clark (2005): Constructing Expertise: Inequality and the Consequences of Information-Seeking by Breast Cancer Patients*

In investigating the illness experiences of women participating in a breast cancer support group, Clark (2005) found that information-seeking was a crucial way in which these women were able to cope with the negative emotions (anxiety and dread) they were experiencing. To collect data for her research, Clark conducted field observation at three different breast cancer support groups – two of which consisted of middle-class women (roughly defined as those holding a bachelor's or professional degree) – and one of which consisted of working-class women (roughly defined as women with high school diplomas only) over a two-year period. She also conducted in-depth interviews with thirty support group participants and five support group facilitators. Through grounded theory (which

involves remaining open to whatever one finds in the data one has collected), Clark found that class-based inequalities contributed to differences in how the women gathered and interpreted information about breast cancer. Although the middle-class women were able to gather and interpret information on their own, drawing on resources such as their literacy skills, knowledge, self-confidence, and familiarity with libraries, the working-class women relied solely on their doctors to provide them with the information they needed.

Overall, Clark (2005) found that the middle-class women in her study became lay experts (or expert patients) and were more assertive with their health-care providers and ultimately more satisfied with their treatment-related decisions. In contrast, the working-class women relied solely on their doctors for information, upholding and reinforcing the doctors' status as experts. As a result, they ended up feeling treated paternalistically by their doctors, hurried into making hasty and uninformed decisions, and ultimately felt less satisfied with their treatment-related decisions. While the middle-class women empowered one another, helping each other with seeking and interpreting breast cancer-related information, the working-class women placed their trust in their doctors' expertise, reinforcing the power held by their doctors.

Ultimately, the differing resources the women were able to bring to the table and their differing strategies regarding the collection, sharing, and interpretation of breast cancer information led to quite different outcomes. The middle-class women were able to get better care, as the resources they had available to them and the information-related strategies they adopted came together to enable them to:

1. develop greater knowledge about the options available to them;
2. become better able to, and more comfortable with, asking questions of their doctors; and
3. increase their ability to take a more active and better informed role in treatment-related decision making.

*Jung, Ramanadhan, and Viswanath (2013): Effect of Information Seeking and Avoidance Behavior on Self-Rated Health Status among Cancer Survivors*

Another consumer health information behavior study that intersects with the concept of health justice is Jung, Ramanadhan, and Viswanath's (2013) investigation into the types of social determinants (including socioeconomic status (SES), as measured by educational attainment and income, and race/ethnicity) that are linked with disparities in cancer survivors' ratings of their own health status and the extent to which their health information-seeking/avoidance behaviors help to explain this relationship. These researchers contacted a random sample of 1,000 cancer survivors from a database maintained by a major US cancer center, asking them to participate in a survey. Potential participants had to have been diagnosed within the past five years, not undergone any type of treatment in the previous year, exhibited no signs of tumor recurrence or metastasis, and speak English or Spanish. A total of 521 participants (for a response rate of just over 50 percent) completed the survey, either via mail, telephone, or online. Nearly three-quarters of the participants were women and the average age across all participants was 54.3 years. More than 80 percent of the participants were non-Hispanic white; just 7 percent of the participants were Black or African American, and 5 percent were Hispanic or Latino.

Jung et al. (2013) found that participants who were Black/African American or Hispanic, who were on Medicare or Medicaid insurance, who had lower educational attainment, and who earned less than \$30,000 per year were more likely to report their health status as fair or poor (rather than good or excellent/very good). They also found that participants who reported avoiding health information (rather than seeking it) and who reported encountering greater information access barriers were more likely to report that they were in fair or poor health. The authors conclude that health disparities (as measured by self-reported health status) are strongly linked to both social inequalities and health communication inequalities (defined as differences individuals experience in the accessibility of information

and in their ability to take advantage of this information). They also concluded that health information-seeking/avoidance behaviors do, in fact, help to explain the relationship between social determinants and health outcomes.

*Bennett, Chen, Soroui, and White (2009): The Contribution of Health Literacy to Disparities in Self-Rated Health Status and Preventive Health Behaviors in Older Adults*

A third study of consumer health information behavior that intersects with the concept of health justice is Bennett, Chen, Soroui, and White's (2009) investigation into whether health literacy mediates the connection between demographic factors (race/ethnicity and educational attainment) and both self-rated health status and engagement in preventive health behaviors. To investigate these potential connections, the researchers conducted multiple regression analyses using nationally representative data from the 2003 National Assessment of Adult Literacy (NAAL) to test whether known values of two or more independent variables, such as race/ethnicity and educational attainment, can be used to predict values of some unknown dependent variable, such as self-rated health status. A total of 2,668 US older adults (ages 65 and up) participated in the 2003 NAAL. The vast majority (85.3 percent) of the participants were non-Hispanic white and just over half (55.2 percent) were female. Participants were fairly diverse with regard to SES, with 18.4 percent of participants in poverty; nearly one-fourth lacked a high school diploma.

Two of the NAAL instruments were relevant to Bennett et al.'s investigation – the background questionnaire and the health literacy scale. In addition to collecting demographic information, the background questionnaire also asked participants to use a 5-point scale to rate their health, selecting from excellent, very good, good, fair, or poor. In addition, it asked participants about their engagement in certain preventive behaviors, including whether they had gotten a flu shot, visited a dentist, and received a mammogram (for female respondents) during the prior year.

The NAAL health literacy scale engaged participants in twenty-eight health-related tasks. None of the tasks required that participants be familiar with specialized health terminology. The twenty-eight tasks were designed to measure print literacy of various types, including prose literacy (the ability to read a consent form); document literacy (the ability to fill out a health insurance form); and quantitative literacy (the ability to calculate a health-care bill). These measures were then combined into a single health literacy score, and the resultant scores were used to categorize participants into one of four different performance levels: below basic health literacy, basic health literacy, intermediate health literacy, or proficient health literacy.

Bennett et al. (2009) found that Black and Latino respondents were 1.5 times more likely than white respondents to report that they were in fair or poor health. Respondents who reported less than a high school education were 2.4 times more likely than those who had a high school diploma to report fair or poor health. Regarding preventative health behaviors, Black women were more likely than white women to have gotten a mammogram, but white participants were more likely than Black participants to have gotten a flu shot or a dental checkup within the past year. Participants with a “less than high school” education were less likely than the more educated participants to report that they had engaged in these preventive activities.

With regard to health literacy scores, white participants’ health literacy scores, on average, fell into the basic level, while Black and Hispanic participants’ scores, on average, fell into the below basic level. With regard to educational attainment, the scores of participants who reported a “greater than high school” education fell, on average, in the intermediate level, while those of high school graduates’ (or equivalency) (but no further education beyond high school) scores, on average, fell in the basic level. The scores of participants who reported not completing high school fell, on average, into the below basic level.

Bennett et al. (2009) further investigated whether health literacy levels contributed to disparities in participants’ self-reported health. They found that higher levels of health literacy were associated with

increased reports of being in excellent, very good, or good health, and of having gotten a flu shot, a mammogram, or dental care during the preceding year. They also found that when health literacy levels were taken into account, the association between race/ethnicity and both self-reported health status and flu vaccines was reduced. Similarly, the associations between educational attainment and each of the health outcome variables (self-reported health status and engagement in the three preventive care behaviors) were also reduced. In all of these cases, health literacy was found to be an important factor that helped to explain these relationships. In conclusion, Bennett et al. recommend addressing the literacy-related obstacles to health care experienced by older adults by working with them to improve their health-related print literacy and by reducing the reading level required for this population to understand print materials that are targeted toward them.

## **CONCLUDING THOUGHTS**

In this chapter, we have discussed the concepts of consumer health information behavior and health justice and delved into the important ways in which these concepts intersect. An individual's health-related information behaviors, along with the various factors that motivate, demotivate, or impede them in these processes, can have tremendous consequences for the individual's health trajectory and the health outcomes that can and do unfold for them. Both information access and health literacy play key roles in consumer health information behavior. Individuals and populations who experience social injustice often lack sufficient and equitable physical and intellectual access to resources (including information) and opportunities and, as a result, do not have a fair shot at being able to live a long and healthy life. However, you as a current and/or future information professional are well prepared and ideally positioned to help to move us closer to health justice. More specifically, you can help in these efforts by working to ensure the equitable distribution of information and by enhancing the ability of all individuals to find,

understand, assess, manage, make use of, and maximally benefit from information.

## DISCUSSION QUESTIONS

- Have you ever experienced or observed any health injustices in your lifetime (whether firsthand or secondhand)? If so, what was the nature of these health injustices? Was information (or a lack of information) involved in these injustices? How might these types of health injustices be prevented in the future? Is there some way that information professionals might help to prevent and/or address what you (or someone else) experienced?
- Design a study to investigate the health-related information behaviors of a particular population that frequently experiences social injustice. For example, you might select homeless people, immigrants, prisoners, LGBTQ+ individuals, older people, or people who have a disability. Once you have selected a particular population, think of one or two research questions that you would like to investigate. How would you go about recruiting participants and gathering data that would enable you to answer your research question(s)? How might you go about uncovering evidence of any health injustices they may have faced? Why would your selected methods be ideal for your investigation?
- Select one of the three studies described in the final section of this chapter and describe your thoughts about the recruitment, data collection, and data analysis methods used by the researcher(s). Do you buy their findings? Why or why not? If you were to conduct a similar study, what would you change, if anything, about their methods?
- Thinking about the information science career you're planning to pursue, can you think of any way(s) in which issues of health justice/injustice may come up? If so, what are some specific steps you might be able to take to try to prevent and/or reduce health injustice?

**Learning Activity:** Reread the two stories at the beginning of this chapter. Do you believe that Dave experienced health injustice? If so, please identify some of the specific factors that seemed to contribute to this experience. If not, please explain why you feel that Dave and Norma had equitable capabilities to be healthy. What are some ways that we, as a society, might be able to reduce health disparities and move toward health justice?

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# 14

## *Youth Information Behavior*

*Dr. Zelden, the principal of River's Edge Elementary School, wanted to add a digital literacy course to the curriculum for the fifth-graders in the school. Her goal was to better prepare them as they transitioned to middle school, where they would be expected to conduct independent research that would require them to gather, assess the relevance and credibility of, and to manage, understand, and use information available on the open Web. Because Dr. Zelden had no idea how these fifth-graders were already going about gathering and assessing information for their schoolwork or how much they already knew about how to locate and evaluate online information, she began her course design process by conducting a research study. With the assent of thirty randomly selected fifth-graders and with the informed consent of their parents, Dr. Zelden conducted a paper-based survey to ask the fifth-graders about their school-related information-seeking practices. She also administered a paper-based digital literacy test tailored to children in the fifth grade. A few weeks later, she met with each of the participating students to observe them as they conducted online searches for*

*information they needed for their schoolwork and interviewed them to obtain further details about how and why they conduct their school-related research and to further explore any gaps in their digital literacy that were suggested by their performance on the test.*

*Jaxon Andrews, chief game designer at Black Tuxedo Games, wanted to design a game for preteens that would not only be fun for them, but also help them to learn how to construct effective queries, accurately and efficiently evaluate search engine results, and assess the credibility of online information. Before undertaking the actual design process, Jaxon conducted a study in order to learn more about his target audience, children between the ages of ten and fourteen. Based on some earlier research he had conducted with this age group, Jaxon had an earlier prototype that he wanted to test out with some preteens and get their feedback; however, he also wanted to ask these participants some more open-ended questions in order to find out about their general interests, their information-seeking habits, and their preexisting digital literacy skills.*

\* \* \*

Some information behavior investigations, such as the two described in the vignettes, focus specifically on the information behavior of children and/or teens. Such studies span a wide range of contexts, including school, home, libraries, and after-school clubs/activities. Some of these studies focus on children's and/or teens' school-related information behaviors, while others focus on their information behaviors that relate to their leisure activities, such as their engagement with their hobbies. The phrase "youth information behavior" is frequently used to describe investigations into the information behaviors of children and/or teens, generally up to about the age of eighteen (although studies of college students' information behavior are sometimes considered to be part of the youth information behavior literature). However, information behavior researchers who conduct these investigations frequently focus on

children and/or teens of a particular age range. For example, they may study the information behaviors of:

- preschoolers or pre-kindergarten (pre-K) students (usually defined as up to about age five or six);
- elementary school children (generally defined as approximately ages six to eleven or twelve);
- middle-school students, sometimes called “tweens” or “pre-teens” or “early adolescents” (generally defined as approximately ages eleven or twelve to fourteen or fifteen); or,
- high school students, sometimes called “teens” or “late adolescents” (generally defined as approximately ages fourteen or fifteen to eighteen or nineteen).

The precise age ranges that are used to define each of these categories can vary quite a bit from researcher to researcher, and some researchers investigate the information behaviors of children/teens of just one particular age (e.g., 11-year-olds) or of children/teens spanning two or more of these age ranges (sometimes even in the same study).

Although investigations into the information behaviors of youth are a relatively new addition to the information-seeking literature (representing just a small proportion of the information behavior studies that have been conducted to date), there has been substantial growth in this area over the past two decades or so (Agosto, 2019). In this chapter, we will take a look at some examples of these investigations. In each of the four subsections, we describe three examples of studies that have investigated the information behaviors of youth (preschoolers, elementary school children, middle-school students, and high school students) in various contexts, such as at home, at school, and during visits to their school or local public library. As you read about these studies, please keep in mind *when* each study was conducted, as information resources and technologies, as well as youth access to these resources and technologies, have changed over time. However, as you will see,

many of the core findings relating to people's information seeking actually remain quite consistent over time.

## PRESCHOOLERS

Preschoolers (usually defined as up to the ages of about five or six) have very seldom been the focus of information behavior studies. However, a few notable exceptions include Given et al.'s (2016) study of preschoolers' use of information technologies in their homes, Stewart's (2016) exploration of pre-kindergarten students' information-seeking behaviors in the preschool setting, and McKechnie's (2000) study of preschool girls' use of the public library.

Given et al. (2016) explored the ELIS of fifteen Australian preschool children (ages three to five) as they interacted with digital technologies in their homes. They sought to understand the ways in which these children use the information technologies available in their homes and the various types of ELIS activities they engage in as they use these technologies. The researchers recruited families from eight different early childhood centers located in Queensland, Australia, and asked the parents to videotape their child over a one-week period as they used laptops, desktops, and various types of handheld devices in the course of their typical, everyday activities. The researchers then analyzed the resulting twenty-nine hours of video recording, taking an inductive, thematic approach in order to identify all emerging themes that related to the children's activities and engagement with technologies, other people present in the recordings (such as parents or siblings), and materials (such as dolls).

The researchers found that these young children had access to many different types of technological devices, including iPads, laptops, desktops, smartphones, iPod touches, game consoles, and interactive e-reading devices. They observed children using these devices to engage in a wide range of activities, including listening to music, looking at family photos, watching online videos, and playing computer games. Many of the children also engaged in artistic activities, such as drawing and singing, and in sociodramatic play (by, for example, playing a particular role, such as mother, farmer, or

police officer). The researchers also observed children engaging in literacy- and numeracy-related activities, such as entering search queries and asking about the meanings of particular words.

In conclusion, Given et al. (2016) noted that the children's information practices were shaped by the tools, sources, and people with which they interacted as they engaged with information technologies. In more than half (55 percent) of the observed instances of participants engaging with devices, the children interacted with their parents and/or siblings or engaged in self-talk while interacting with the technology. In some of these cases, parents and/or siblings helped the children to set up and/or to use the technology, thereby serving as sources of social and cultural capital, reinforcing the children's behaviors and helping to shape not only their present-day play experiences, but also their future learning and ELIS activities.

In another study of young children's information behaviors, Stewart (2016) observed ten pre-kindergarten students as they sought information from other people, including teachers, administrators, school librarians, other types of school staff members, and their peers, while at school. Using participant observation, Stewart recorded various aspects of the children's information-seeking behaviors, including the kinds of questions they asked, the person to whom they posed each question, and the answers that were provided to them. She also identified the various techniques that school personnel used in order to encourage the children's information seeking. Stewart used triangulation; in addition to observing the children, she also conducted semistructured interviews with the teacher and the teacher's aide in order to ask them about the students' general question-asking behaviors and about their own practices while responding to student questions. Drawing on her videotaped observations of the children's information-seeking behaviors and the detailed notes she took while conducting her observations (that is, her "field notes"), as well as her audiotaped interviews with the teacher and the teacher's aide, Stewart compared and cross-checked her data and identified patterns in the participants' information-seeking behaviors.

Stewart (2016) found that the pre-kindergarten students she observed mainly consulted their friends or classmates when they needed information. The second most frequently consulted source was the children's teacher. Stewart also found that the children's information needs largely pertained to their own personal life situations or events and/or to their need to verify information they already held. When she asked the teacher and the teacher's aide about the students' information-seeking behaviors, she found that their responses largely mirrored what she had observed herself in the classroom. Additionally, Stewart learned that the students rarely questioned the validity of the responses provided by the teacher and the teacher's aide. She also discovered that the teacher and the teacher's aide wanted to add information-seeking skills into the curriculum and that they wanted to use, as well as model the use of, other types of information resources, such as books, the Internet, and other age-appropriate resources.

In conclusion, Stewart (2016) recommends that early childhood education teachers receive training on how to use information-seeking exchanges with pre-kindergarten students as opportunities for instruction. She points out that providing pre-kindergarten students with instruction regarding information-seeking and library science skills could provide them with indirect learning opportunities and help to shape their educational habits and hone their information-seeking skills for the future.

A third study of preschoolers' information behaviors focused on exploring the ways in which preschoolers borrow and use information resources from their public libraries and the impacts these resources have on their lives. McKechnie (1996) conducted a three-stage study. First, she observed and audio-recorded thirty preschool girls (all just under four years old) as they visited their local public libraries with their mothers. Following these visits, she asked the girls' mothers to observe and keep a diary of their children's use of library materials and any other library-related activities in which they engaged over a one-week period. The researcher then conducted a follow-up interview with each mother (and often the child, as well) in order to confirm her own observations and to learn more about the children's

behaviors, both while in the library and following their library visit. Drawing on her transcripts from the library visit observation and her field notes, as well as her interviews with the children's mothers, McKechnie identified general themes pertaining to the children's activities during and following their visit to the library.

McKechnie (1996) found that the children engaged in a wide variety of activities while at the library, including returning and checking out library materials, conducting catalog searches and selecting and using library materials, playing with toys, interacting with other children, and participating in library programs. During the one-week follow-up period, the children's mothers observed their children talking about the library, going back to the library, playing "library," and using and discussing the materials they had checked out. The children's use of the collections and services offered by the library provided them with numerous learning opportunities, enabling them to develop literacy skills and an understanding of how libraries work. McKechnie emphasized that the provision of stories, above all other types of library services, best supported the learning of these children.

In conclusion, McKechnie (1996) underscores the important impacts that public library services can have on preschoolers' learning and the key roles played by the mothers in the children's use of these services. Noting the lack of interaction between children and library staff, McKechnie points out that it is important for public libraries to offer materials that children can use along with a caring parent. She also suggests that public libraries might look into ways they can increase interactions between children and their staff, as these conversations could provide children with additional opportunities to acquire literacy skills and to learn more about the library. McKechnie also recommends holding workshops to teach parents and library staff specific strategies they can use to support children's learning. Drawing on her finding regarding the central importance of stories in children's learning, McKechnie further suggests linking materials in the collection to the programs and toys on offer at the library.

## **ELEMENTARY SCHOOL CHILDREN**

Moving to a slightly older age group, investigations of the information behaviors of elementary school children (roughly ages six to eleven or twelve) are somewhat more numerous than those focusing on preschoolers. In this section, we'll look at three studies of the information behaviors of elementary school-aged children, including Foss et al.'s (2012) study of the various search roles adopted by children as they conduct Google searches in their homes; Rutter et al.'s (2015) investigation of the query reformulation behaviors of children as they conduct searches for a task at school; and Hirsh's (1999) study of elementary school children's search strategies and relevance criteria as they conducted online searches in their school library and used the library's collection in order to obtain information for an assigned research paper.

Foss et al. (2012) visited the homes of eighty-three children ages seven through eleven to investigate their Google searching processes. During each visit, the researchers first interviewed the child's parents to ask about any computer-related rules they imposed and about their child's experience with searching, their searching habits, and any sources of frustration their child has experienced. Next, they interviewed the child, sitting with them in front of the computer the child used most frequently. They began the interview by asking some general questions about the child's computer usage and their reasons for conducting searches. They then asked the child to show them how they usually search for information and to show them an example of conducting a search related to their own personal interests. Next, they asked the child to conduct searches for two simple imposed tasks ("Can you search for information on dolphins?" and "Can you search for information on what dolphins eat?"), and then for one more complicated task ("Which day of the week will the Vice President's birthday be on next year?") that would necessitate a multistep search. Drawing on transcripts of their interviews with the parents and their interviews with the children, as well as video recordings of the children's search sessions on the computer, the researchers conducted inductive analysis, identifying trends and patterns in the behaviors of the children.

Foss et al. (2012) identified a set of seven search roles that the children appeared to adopt, with any given child sometimes adopting multiple roles, depending on the particular search task at hand. These roles included:

1. Developing Searchers: This was the most frequently observed role. Children adopting this role were very willing to search and excited to use the computer, but they tended to have difficulties with basic search skills and query formulation;
2. Domain-Specific Searchers: This was the second most frequently observed role. Children adopting this role had developed search skills and related domain knowledge but had not yet learned how to apply this knowledge to their searching;
3. Power Searchers: Children adopting this role were able to use keywords in their searches and verbalize their searching process, and they understood how the search engine functioned;
4. Non-Motivated Searchers: Children adopting this role were compliant when asked to conduct searches, but they would not choose to search or use the computer if they hadn't been asked to do so;
5. Distracted Searchers: Similar to Developing Searchers, children adopting the role of Distracted Searcher were excited and willing to search, but they became distracted during the process and were not able to return to the assigned task, even when prompted to do so by the researchers;
6. Visual Searchers: Children adopting this role wanted to turn to pictures and videos to obtain information, even when this was not appropriate to the task; and
7. Rule-Bound Searchers: Children adopting this role conducted searches that were constrained in some way, such as sticking with the same websites or conducting the same steps for every search they conducted.

Foss et al. (2012) further identified findings relating to a set of eight trends: (1) triggers, (2) result selection criteria, (3) visual context, (4) search stoppers, (5) influencers, (6) affect, (7) rules, and (8) complex

search. With regard to triggers, the researchers found that the children's online information seeking was triggered by personal interest, school, playing games, a suggestion from a friend, or due to some daily activity or event (such as a holiday). The children's selection criteria included the content of the snippet in the search results list; their recognition of, or familiarity with, the site; and whether they perceived the site to be kid-friendly. The "visual context" trend pertained to the children's use of images or videos. When asked what makes them stop searching, the children provided a wide range of answers, such as becoming involved in an offline activity, being bored, finding the answer they were looking for, feeling that they had gathered enough information, having a parent tell them to get off the computer, and finding incorrect and unexpected information. The children said that their parents, siblings, friends, and school all influenced their searching and/or computer use. Regarding affect, the researchers found that many children expressed uncertainty about their search processes and selections, often experiencing frustration with the search process. Some children mentioned specific guidelines for searching (such as choose the first result, do not use Wikipedia, or do use Wikipedia); however, they did not always actually adhere to them. Regarding the final trend noted by the researchers – complex search – many children simply typed in the complex search question verbatim, and ten of the children refused to attempt this search task. Overall, Foss et al. (2012) found some important age-related differences: triggers to search move from home-based interests for the 7-year-olds to school-based interests for the 11-year-olds, and parents are more influential for the younger children while school is more influential for the older children.

In addition to offering recommendations for future research, Foss et al. (2012) also offered suggestions for designers of search tools. Specifically, they recommended that designers scaffold the children's learning to help them develop the skills exhibited by the Power Searchers in this study. They also suggest that interfaces be designed so that they assist children with breaking down a complex search task into smaller steps and facilitate their ability to revisit familiar sites by placing them higher up on the results page. They also

recommend a more prominent placement of “related” or “similar” cross-links so as to encourage children to visit new sites and to cross-verify information. Additionally, the researchers suggest emphasizing the site’s URL and providing indicators of reliability right on the search engine results page.

In a second study of the information behaviors of elementary school-aged children, Rutter, Ford, and Clough (2015) investigated children’s (ages eight to nine) techniques for reformulating their queries as they carried out searches for a project at school. These researchers aimed to learn why and how children reformulate their queries, as well as the ways in which information retrieval systems support them in this process. With the permission of the information and communication technology teacher at a primary school in Sheffield, United Kingdom, the researchers conducted two visits to the classroom to observe and record (using Camtasia) a total of twelve children as they worked in pairs to answer up to three specific questions related to the topic they were learning about that term, the human skeleton. A few days later, the researchers conducted two follow-up group interviews with the children, showing them screenshots of their searches and asking them how they believed search engines work, what search tools were for, why they had phrased their queries the way they did, what about their searching processes they found easy (or hard), and what they would do if they had a magic wand that would help them with their searches. One week after their interviews with the children, the researchers interviewed the teacher and asked for their feedback on the results of their preliminary analysis of the data they had collected from their observation sessions and from their interviews with the children.

To analyze their data, Rutter et al. (2015) viewed the screen recordings to identify how long it took the children to complete the tasks, how the children’s queries impacted their search results, and their help-seeking behaviors. They also classified the children’s queries as either informational (aimed at finding relevant information) or navigational (aimed at finding sites already known to them) and as either new (the first query for the particular search question), assistance (instances where the children used “did you mean” or

auto-complete suggestions), specialization (queries that contained numerous or more specific search terms), generalization (queries that contained fewer or broader search terms), revision (instances where the child's spelling or grammatical error was correction), and previous (when the child had already submitted this particular query). The researchers also analyzed their interviews with the children, using inductive, thematic analysis. They identified three broad themes from the data:

1. Differences across information retrieval systems;
2. How the children had phrased their search questions; and
3. How the children had selected among different answers.

Rutter et al. (2015) found that all of the children had difficulties locating information in the results pages, frequently missing relevant information and finding it challenging to select among search results. They tended to scan the results pages linearly, thus often missing relevant information that appeared further down the screen. The children generally reformulated their queries for one of the following reasons: They were unable to find the information they needed; they wanted to validate some information they had found; or they wanted to fix spelling mistakes in their prior queries. To reformulate their queries, they used a number of different strategies, such as turning to a different information retrieval system; gleaned information from their earlier search results pages; and using the "did you mean" and auto-complete features of the search engine. The children also used their earlier queries, corrected any errors they had made, and edited their queries so that they were more specific.

In conclusion, Rutter et al. (2015) point out that the children mostly interacted with the information retrieval system as they reformulated their queries and less commonly drew on their own preexisting knowledge. They offer specific recommendations as to how search systems could better support children as they formulate and reformulate their search queries by:

- offering tools that are specifically tailored to the nature of the query the child entered;
- suggesting ways in which the child might narrow their queries; and
- taking into account the important finding that children tend to linearly scan through lists of search results.

In another study of the information behavior of elementary school children, Hirsh (1999) observed and interviewed a random sample of ten fifth-grade students about their search strategies when using an online catalog, an electronic encyclopedia, an electronic index of magazines, and the open Web for a school research project (i.e., a research paper on the sports figure of their choice). Hirsh also sought to identify the specific criteria the students used in order to assess the relevance of the information resources retrieved.

To conduct the study, Hirsh interviewed and observed the children at two different points in their research process. The first interview took place during the first week after the students were given the assignment. The researcher asked the students about their selected sports figure, their access to computer resources outside of school, any research they had already completed for this paper, where they had conducted this research, and their reasons for choosing the particular resources they had used. Last, Hirsh asked the students if they still needed some additional information for their paper and observed them as they used the school library computers and collection to search for, and assess the relevance of, additional information.

The second interview session was conducted during the third week of the students' work on their projects. Hirsh asked the students to share the information they had gathered since their last interview, where they had obtained it, and their reasons for selecting this information. Next, they were again asked if they needed more information for their project. If so, the researcher observed and shadowed the children as they worked on their project in the school library. All interview/observation sessions were audio-recorded and transcribed. The researcher coded the transcripts, as well as her

field notes, to identify the specific relevance criteria the students used when selecting information resources to use for their project.

Hirsh (1999) found that the students were very motivated to work on and collect information for this particular research project; in fact, all of them began their research right after receiving the assignment. In contrast to the findings from several earlier studies of the information behaviors of students, these children rarely just went with the first piece of information they encountered. They were very careful to evaluate the information they found to make sure that it met their specific information needs and requirements. Hirsh further found that these students were experienced searchers and were confident in their ability to use electronic resources to conduct their research. The students were knowledgeable about the need for a broader search than just the name of their sports figure and to switch the order of their athlete's name when using some types of resources. They also asked their peers and the librarian for help when they needed it. The students tended to begin their searches in the library's online catalog and had no problem locating their selected books on the bookshelves in the library. They also tended to browse nearby books to find additional resources they could use for their projects. All of the students also turned to the Internet to research their selected athlete; however, some of the students did not feel that the information they found online was helpful.

Hirsh (1999) noted that the children did not use advanced search features and navigation tools when searching the Web. They often repeated their earlier queries because they didn't know how to return to their previous results sets. Similarly, they did not make notes regarding useful URLs or websites and, thus, spent a lot of time trying to recreate one of their earlier successful searches or trying to return to a site they had found helpful. Hirsh further found that the students tended to skim text-based materials in order to determine if they would like to save it for their future use. They looked at the titles of books, articles, and websites, preferring ones that included the name of their selected athlete. They also scanned Internet summaries, magazine abstracts, and bibliographic notes fields, and skimmed book covers, tables of contents, and indexes; the leading

sentences of paragraphs in articles; and the first paragraphs of websites.

Hirsh (1999) identified a wide range of relevance criteria that the children used in order to evaluate the text-based information they had found, including (in descending order based on how frequently the criterion was mentioned):

- Topicality (related to their topic);
- Novelty (contained information new to them);
- Authority (mentioned only by 2 percent of participants, this criterion refers to whether the text was deemed to contain information that was expert and reliable);
- Interesting (of personal interest to the child); and
- Peer interest (how likely the child felt it was that their peers would be interested in this information).

Less frequently mentioned relevance criteria used for text-based materials included convenience/accessibility, language, quality, and recency/temporal issues. Hirsh found that the children spent a disproportionate amount of their research time looking for pictures of their selected athlete (which was just one required element of the assignment), rather than trying to obtain facts about them. With regard to selecting graphical material, the children mentioned the following relevance criteria: interesting, clarity/completeness, peer interest, expediency (pictures are easily obtainable and were a required element of the project), and authority (mentioned just one time). Hirsh further found that the children used different relevance criteria as they progressed in their research, frequently moving from focusing on just topicality to requiring the information to be interesting.

In conclusion, Hirsh (1999) points out that children need not only better search skills so they can obtain the information they need but also better information literacy skills so they can make more informed decisions when selecting which information to use. She emphasizes that, as students are increasingly turning to more complicated and less well-structured electronic resources (such as the Internet), they need training to be able to evaluate and verify the accuracy and

authoritativeness of the information they find. Hirsch recommends the development of electronic resource interfaces that are more age appropriate and better able to support children as they search for information and strive to evaluate and verify its authority.

## MIDDLE-SCHOOL STUDENTS

Some information behavior researchers have focused on children that are roughly middle-school-aged, frequently termed “tweens” or “preteens” or “early adolescents,” and generally defined as children between the ages of approximately eleven to fifteen. In this section, we’ll discuss Meyers et al.’s (2009) investigation of the everyday information behaviors of tweens, Taylor et al.’s (2019) investigation of the behaviors and perceptions of sixth-grade students as they browsed the school library’s collection of fiction books, and Kodama et al.’s (2017) investigation of middle-school students’ mental models (that is, their understandings) of Google.

Meyers, Fisher, and Marcoux (2009) conducted fourteen focus groups and twenty-five individual interviews with a total of thirty-four preteens (ages nine to thirteen) to learn about the situations for which they look for everyday information, the sources they consult and why, the different types of social settings that foster information sharing and how they do so, and the various types of factors that promote or hinder their information seeking. Striving to work with a diverse sample of tweens, the researchers recruited tweens from (1) a city in which there was a university campus, (2) a faith-based ministry in an urban neighborhood, and (3) an elementary school located in a middle-class suburb. The research questions guiding the study pertained to these tweens’ information needs, their everyday life information-seeking practices, the barriers they encounter when seeking and using information, their strategies for managing the everyday information they accumulate, the criteria they use when they are assessing and sharing information and information sources, how different social types (e.g., friends, parents, teachers) play various roles in the flow of information, and the roles that are played by information grounds in these tweens’ lives. Drawing on transcriptions

of their interviews and focus groups, the researchers identified major themes and patterns of behavior relating to the participating tweens' information worlds, including social, affective, and cognitive dimensions.

Meyers et al. (2009) found that the participating tweens expressed a range of information needs, particularly ones relating to immediate or short-term goals or activities, such as schoolwork, social events and relationships, and sports and hobbies. The tweens also described needing to receive and share private or secret information, particularly with their peers. Their strategies for gathering everyday information were wide ranging, including commonly turning to their peers for information, as well as the Internet and occasionally books, magazines, TV, and radio. They described a range of barriers they encountered with regard to their information seeking and use, including parents' restrictions on their source use, whether because of safety concerns (e.g., chat rooms) or because the tween would need an adult to transport them to a particular information venue. Also, adults sometimes controlled the information resources and enforced particular information-seeking and -sharing behaviors. Tweens' information seeking was sometimes blocked by their inability to access tools, such as computers, the Internet, and telephones, whether due to parental restrictions or due to a physical lack of access in the home. The tweens' information sharing was sometimes thwarted by adults' presence, and their information seeking and sharing were sometimes restricted due to their schedules and the daily structure of their lives (e.g., being at home versus being at school). Finally, participating tweens described specific types of social costs (e.g., embarrassment, misunderstanding, loss of esteem, punishment) that can be associated with some types of information behavior. This particular barrier shaped their willingness to ask questions and to share information with particular other people in their lives.

With regard to their management of everyday information they have accumulated, Meyers et al. (2009) found that the tweens described using different techniques, most commonly writing notes on post-its or their hands (37 percent) and relying just on their memories (32

percent). Many of the tweens reported using bookmarks when searching online, and some reported using paper calendars or planners. When assessing and sharing information and sources, the tweens applied many different criteria, including credibility and trust, perceived authority of the source, and degree of match with their own personal experience. Meyers et al. also found that the tweens' question-asking and information sharing greatly varied depending on whether they were interacting with a friend, parent, teacher, or some other social type. The tweens were much more willing to share their information needs and information with people whom they trusted and had known for a longer duration.

Meyers et al. (2009) also learned about a wide range of information grounds (see [Chapter 4](#) for the definition and [Chapter 12](#) for a description of Pettigrew's (1999) full study) where the tweens shared information with others, often their peers. The most commonly mentioned information grounds included school (cafeteria, hallway, playground, bus), athletic fields, shopping malls, community parks, and their homes and neighborhoods. Additional information grounds mentioned included churches, libraries, restaurants, convenience stores, and public transit.

In conclusion, drawing on their finding that the tweens predominately relied on interpersonal sources when seeking to fulfill their information needs, Meyers et al. (2009) proposed a youth-centered professional services framework consisting of five principles to help guide the mediation of tweens' everyday-life information seeking and use:

1. Tweens' information seeking is a natural and necessary part of their physical, social, and intellectual growth;
2. Information behaviors have important social and affective aspects;
3. Tweens develop and improve their information literacy skills in both informal settings and at school;
4. Tweens' information seeking is shaped by their trust toward various information sources, including their perceptions regarding

- the authority of the source and the potential costs of consulting a particular source; and
- 5. Informal social settings provide important opportunities for tweens to share everyday life information with their peers.

In a second study of middle-school students' information behavior, Taylor, Hora, and Krueger (2019) observed sixteen sixth-grade students as they browsed the most popular book stacks (realistic fiction, graphic novels, horror/spooky, and humor) in their school library. They also conducted follow-up interviews with a random sample of eight of these students, asking them questions about their experiences with, and perceptions about, browsing, finding, and checking out fiction books from the school library. In addition, they surveyed eight sixth-grade classroom teachers to learn about their perceptions of the students' book selection and of the library's use of genrefication to organize the materials in their fiction collection. Taylor et al. analyzed their videotaped observations of the students browsing the school library's collections, as well as a spreadsheet into which they had entered data from their interviews with the students, in order to identify emergent themes and uncover patterns in the data. They also conducted thematic analysis of the data they had collected from the teachers via their survey.

Taylor et al. (2019) found that the students identified books of interest to them by browsing the collection, drawing on their connections with their peers and teachers, and using their own information literacy skills (gained from instruction in the library, as well as in their classrooms). When first selecting a book, students drew on their existing knowledge of the relevant genre. Taylor et al. also found that the students preferred to browse with a peer, and that students who did browse with a peer were more likely to check out a book. Although some students came to the library already having a genre in mind, they tended to browse multiple genres. Based on their surveys of the teachers, the authors found that the teachers felt that the library's organization of their fiction collection based on genre supported the students as readers and reinforced their own goals around teaching students about the concept of genre.

In conclusion, Taylor et al. (2019) emphasize that school library collections, both in terms of content and organization, should be responsive to the students' interests, needs, and experiences. They also underscore the importance of having a well-resourced library run by a professional school librarian who teaches the students about the organization of the collection and also provides assistance with readers' advisory (that is, helps the students to select books that are likely to be of personal interest to them). In addition, they emphasize the need to permit and support students' social interactions regarding their book selection and the importance of collaborative discussions between classroom teachers and the school librarian. Such discussions can help to ensure that the collection and the way in which it is organized will support the teachers' goals for their students and facilitate student success.

In another study of the information behavior of tweens, Kodama, St. Jean, Subramaniam, and Taylor (2017) asked twenty-six students (ages ten to fourteen) in the *HackHealth* program (see [Chapter 4](#) for a more detailed description of this program) to draw a picture or write down in words how they think Google works behind the scenes to find websites for people. Their goal was to elicit students' mental models (that is, their understandings) of Google. Students were provided with a large piece of white construction paper and markers for this activity and were given approximately twenty minutes to work on their drawings. After finishing, the students were asked to share their drawings with the researchers, the school librarian, and the other *HackHealth* participants present that day, walking them through what they had depicted in their drawings and responding to any questions that were posed. Working with the student drawings, as well as transcriptions of the students' verbal presentations and their responses to any questions posed to them, the research team used thematic content analysis to identify a 6-item typology of drawings that emerged from the student drawings and their accompanying verbal descriptions. They also identified fourteen more specific themes that appeared in this data.

The typology developed by Kodama et al. (2017) included the following items (listed in descending order based on the percentage of drawings that were assigned to each typology entry):

1. Google as people (drawings that included people, such as Google workers, or drawings that depicted Google as having human characteristics);
2. Google as equipment (drawings showing computer hardware, such as a monitor or keyboard);
3. Google as connections (drawings that depicted some type of connection, such as wires/cables connecting computers or satellites or antennas transmitting signals);
4. Google as physical space (drawings that showed Google as a building);
5. Google as interface (drawings that showed the actual Google interface, frequently including the Google logo in multiple colors and features and functionality present on the Google site); and
6. Google as codes (drawings that showed Google as a series of numeric, alphabetic, or alphanumeric codes).

A single drawing was often assigned to two or three typologies, as applicable. More than half of the students' drawings depicted Google as people; however, just four of the drawings depicted Google as computer code.

With regard to the specific themes that arose from the students' drawings, Kodama et al. (2017) developed a 14-item coding dictionary. These codes included (in descending order based on the percentage of drawings that depicted each theme): (1) computing equipment, (2) anthropomorphism, (3) connections, (4) Google worker, (5) trust, (6) place, (7) query, (8) branding, (9) transparency, (10) user, (11) features/functionality, (12) computer code, (13) intelligence, and (14) gender balanced. Computing equipment was depicted in 20 (77 percent) of the student drawings, and anthropomorphism (showing Google as having some human characteristic) was depicted in 17 (65 percent). Sixteen (62 percent) drawings showed connections, such as cables or satellites. Just less

than half of the drawings depicted Google worker(s) (12; 46 percent) and/or trust (11; 42 percent). With regard to trust, one student drew two people – a user searching “I want to learn about snakes” and then another below this person, writing “Creepy guy is actually the algorithm.” However, some students’ drawings and verbal descriptions suggested greater trust toward Google, such as the one student who said “What you don’t see is these people working really hard, going ‘hurry up!’ or ‘put the #1 best source’” and another who said that Google “pick[s] the websites that they think is best” (pp. 425–426).

In conclusion, Kodama et al. (2017) emphasize the value of eliciting young people’s understandings of how Google works to help to shape digital literacy instruction efforts. Providing young people with digital literacy instruction that has been tailored to where they are at in terms of their own preexisting understandings can help them not only to better understand how Google actually works, but also to become more effective users of Google. Such instruction could be designed to help them construct more effective queries, assess search results more accurately and efficiently, and ultimately find information that is relevant, trustworthy, and useful for them. Kodama et al. further point out that studies such as this one can yield findings that can help to inform search engine developers and search engine interface designers about how they might make invisible searching processes more transparent to users, thereby likely increasing user trust in the search engines and the results they return. Kodama et al.’s findings also demonstrate the value of using methods that echo user-centered, participatory design approaches (see [Chapter 11](#)). By asking tween and teen users to sketch their own personal conceptions of Google’s search engine, Kodama et al.’s study offers future researchers design insights on how youth view information-seeking technologies and how to help youth improve their information seeking practices.

## HIGH SCHOOL STUDENTS

Some researchers have focused their investigations on the information behaviors of high school students or teens or adolescents, generally ages approximately fourteen to fifteen through eighteen to nineteen. In this section, we'll look at Fidel et al.'s (1999) study of high school students' online searching behaviors, Aillerie and McNicol's (2018) investigation into high school students' use of social networking sites (such as Facebook and Twitter) for academic and everyday life information seeking, and Craft et al.'s (2016) study of teens' news-related knowledge and news-consuming behaviors.

Fidel et al. (1999) observed eight high school students over two to three sessions as they searched the Web while working on their homework assignments. Before each student began their search on the computer, the research team member who would be observing them asked them about their plans for their search and what they expected they would find. During their search, the student was asked to think aloud, narrating their search processes for the observer. Following their search, the observer asked the student whether or not they had found what they were looking for, whether it matched what they expected to find, and how they felt about their search. After the final observation session, the observer interviewed the student to gather background information, inquire into their searching behaviors, and learn about their perceptions regarding searching the Web. In addition to observing and interviewing the students, the research team also interviewed the school librarian, the teacher, and the school principal. All observations and interviews were audiotaped, and each team member drew on these recordings, as well as their notes and any Web page printouts or copies of the students' notes they had made, to prepare a case report about the searching behavior of the particular student whom they had observed. The team then performed member-checking (checking in with your research participants to verify your findings), asking each student to review and comment on their case report and to share their thoughts regarding the validity of the report. All students felt that their report accurately described their searching behaviors.

Fidel et al. (1999) found that most of the students did not plan out their searches, and their searching behavior was largely reactive,

responding to what they saw on their screens. The students tended to begin their search based on what had worked well for them in their past searches. For example, they would enter the URL of a site they had visited before or enter keywords that had been successful for them in their past searches, even though the site or keywords weren't always relevant to the current task at hand. The students tended to talk with each other while searching, asking each other questions and providing advice. The researchers identified several commonalities in the students' search processes, including:

- focused searching: directing their searches to answer the specific questions stated on the assignment and using the requirements of the assignment to filter their search results;
- swift and flexible searching: aiming to complete their assignments quickly, the students tended to quickly decide where to go next and whether or not a particular site was relevant;
- the use of landmarks: the students tended to make frequent use of the back button to get back to previously visited sites and tended to have a site they considered home base or a "landmark" to which they would return when they felt lost;
- beginning new searches when the results they were getting were unsatisfactory;
- asking for help from the teacher, the librarian, and/or their classmates; and
- ending a search, sometimes by turning to books to help them to finish or enhance their assignments.

Every student in their study expressed satisfaction with their searches and the information they had found; in fact, they did not feel that they could have improved their searches in any way.

With regard to their opinions about the Web, the students shared their frustrations when searching the Web, the advantages they felt it offered, the types of searches that were most satisfying, and ideas as to how the Web could be improved. The students became frustrated when they were unable to quickly find relevant results, when they reached a site that was under construction or no longer

available, and when they tried to type in URLs that had been provided by their teacher (which sometimes turned out to be incorrect). However, the students also noted that they enjoy searching the Web because they can find a wide variety of information, with regard to both content and format (e.g., pictures). They felt that finding information on the Web was easier than having to perhaps look in several different books to find the information they needed, and that online information is more up-to-date than what they could acquire from books. However, the students preferred to surf the Web without having to look for one specific thing to complete an assignment for a teacher.

Most of the high school students who participated in Fidel et al.'s (1999) study were unable to offer ideas for improving the Web, with the exceptions of speeding up the Internet and using shorter URLs. However, three students offered specific suggestions for improved Web design that would assist them in their searches. Two of these students suggested navigation improvements that would enable users to more easily find what they were looking for. The third student felt that much of the information on the Web was useless, recommending the creation of a central authority that issues guidelines that are then used to evaluate and approve all Web pages before they can be posted.

In conclusion, Fidel et al. (1999) recommend strategies for improving students' searching and learning experiences, including the need to provide students with formal training on Web searching and how search engines work. They point out that, when students had very little domain knowledge on the subject of the assignment and no training on Web searching, they were very inefficient and became frustrated. They emphasize the importance of providing both students and teachers with formal training on searching the Web and of integrating information-seeking skills directly into the curriculum. Fidel et al. further recommend providing additional support to students as they conduct searches, such as offering easy and instant access to an encyclopedia, a synonym finder, and a thesaurus as they begin a search so they can gain some necessary background knowledge and identify some keywords that are likely to retrieve relevant results.

They also recommend adding functionalities to Web browsers that enable users to set a landmark for their current search; that correct users' spelling and typographical mistakes; that enable users to retrieve sites, even if the URL they've entered is partial or incomplete; that assist users with filtering out nonuseful material (such as ads); and that offer graphical cues to support users in making relevance judgements.

In a second study of the information behaviors of high school students, Aillerie and McNicol (2018) conducted an online survey of students (ages fifteen through nineteen) from the United Kingdom, France, Thailand, and Denmark to learn about their use of social networking sites (SNSs), such as Facebook and Twitter, for academic and everyday life information seeking. More specifically, these researchers were interested in whether or not teens use SNSs as information sources, and if so, for what types of purposes. Do they use SNSs just for their everyday life information needs or also for academic purposes? The survey consisted of ten questions, asking respondents about their demographic information (age, gender, course studied); their general use of SNSs (how many accounts they had and the types of SNSs they use); and their information-related use of SNSs (which type(s) of SNSs they use to seek information, how often they do so, which of thirteen predefined (based on the researchers' review of the literature) topics they have researched, and what content they have shared or published themselves on SNSs). Aillerie and McNicol sent the survey link to librarians and teachers through email lists, professional associations, and their own personal contacts, asking them to send the link to any students they had taught who were in the target age range (15 to 19). A total of 473 students responded, nearly all (94.3 percent) between the ages of fifteen and eighteen and two-thirds (65.8 percent) of whom reside in the United Kingdom. The researchers used SPSS to conduct a statistical analysis of the resulting data.

Aillerie and McNicol (2018) found that many of the students had accounts on Facebook (92.9 percent), YouTube (76.0 percent), and Snapchat (75.1 percent), and that many of them reported regular use of Facebook (77.4 percent), Snapchat (33.2 percent), Instagram

(29.2 percent), YouTube (27.3 percent), and Twitter (22.6 percent). Slightly more than half (55.8 percent) of the students indicated that they regularly use SNSs to seek information, and an additional one-quarter (23.7 percent) said they do so occasionally. Just under twenty (18.8 percent) of the students said they rarely or never use SNSs to look for information. The SNSs most commonly used by these students on a regular basis to seek information were Facebook (reported by 39.1 percent of the students), YouTube (30.2 percent), and Twitter (20.0 percent). Instagram and Snapchat, though fairly popular among these students, were very rarely used for information seeking – just 3.8 percent of the students reported regularly using Instagram to search for information, and this figure was just 0.8 percent for Snapchat.

Students who reported using SNSs for information seeking said that they look for information about their friends (69.8 percent), cultural events (56.0 percent), international breaking news (49.3 percent), and national breaking news (40.8 percent). The least commonly researched topics on SNSs included health information (14.8 percent), practical information (17.5 percent), and sports news (19.5 percent). Just slightly more than one-fourth (27.7 percent) of the respondents said they have used SNSs to find information for a task assigned by a teacher, and one-fifth (20.3 percent) said they have done so to find information for a school project that they were working on independently. Additionally, nearly one-quarter (22.4 percent) had used SNSs to find information for educational/vocational guidance.

Overall, the students in Aillerie and McNicol's (2018) study were fairly satisfied with the quality and reliability of the information they obtain through SNSs. Eighty percent of them selected either "3" (36.6 percent) or "4" (44.8 percent) on a 5-point scale, where "5" indicated "always satisfied." Less than one-fifth (16.5 percent) of the respondents said that they publish information on SNSs. Among the students who did report publishing information on SNSs, the most common content was personal photos or videos (67.2 percent), comments and opinions (63.6 percent), academic information (27.7

percent), information they had found elsewhere (24.3 percent), and personal texts (23.7 percent).

In concluding that many teens use SNS for information seeking related to both their everyday life and academics, Aillerie and McNicol (2018) call for future investigations into whether student use of SNSs for academic tasks is encouraged by only specific teachers or only in relation to particular subjects, or whether it is prevalent across the curriculum. They also recommend further research into the ways in which teens use SNSs for academic purposes and whether teachers and/or librarians are providing any related guidance or training. Last, they call for information literacy guidelines and media awareness programs that focus on transliteracy, which encompasses the entire set of media, platforms, and tools (including SNSs) that form people's information landscapes.

In another study of the information behavior of high school-aged students, Craft, Ashley, and Maksl (2016) conducted three focus groups with teens (ages fifteen through eighteen) to investigate their definitions of news, their motivations for reading news, the sources they turn to for news, and the extent of their knowledge regarding the news media industry, its content, and its impacts. The researchers turned to nonprofit organizations offering summer youth programs to ask for help with recruiting teens for their study. These organizations sent out fliers to teens, asking them to contact the researchers if they were interested in participating in the study.

A total of twenty-seven teens (nine males and eighteen females) contacted the researchers and participated in one of the three focus groups, two including ten participants each and the third including seven participants. Focus group questions explored the teens' use of news media, their reasons for seeking information, and their knowledge regarding news media content, industries, and impacts. Each focus group also engaged the teens in three exercises – a discussion of CNN's and the *Chicago Tribune*'s home pages (projected on a screen in the room), an exercise in which they worked independently to list all of the news organizations they could think of, and a discussion (without the moderator present) of what it means to

be a good citizen and whether/how media can help them to become better citizens. The researchers analyzed the focus group transcripts, the notes made by two of the researchers who observed (but did not participate in) the focus groups, and participants' notes regarding the exercises.

Craft et al. (2016) found that the teens turned to a variety of media sources to access news, including social media sites (such as Facebook) and, less commonly, more traditional news media sources, such as radio, television, and print newspapers. Some participants described checking multiple sources in order to ensure that the information they had found was correct. For example, a teen may have learned about an event on Twitter and then used Google to verify what they had seen on Twitter. The teens described "news" using conventional definitions, such as "what's going on right now" and "information you didn't know before" (p. 151). Although the teens largely felt that it was important to keep up with the news, many of them did not find it personally relevant for them at this point in their lives. In fact, many of them did not purposefully seek news, but came across it incidentally when listening to the radio, watching television, or visiting social media sites. However, they did mention that perceiving the relevance of a particular news story would motivate their active news consumption.

With regard to the content of news, the teens pointed out the predominance of bad news and the tendency of the media to sensationalize and exaggerate, as well as to present only a partial picture and to not always be completely accurate or truthful. However, the students were not always aware of the connection between a commercial media channel (such as a TV station) reporting bad news and thus receiving higher ratings (and perhaps more money from advertisers). They also were largely unaware of who it is within a news organization who makes decisions regarding the content they publish; however, they were aware that consuming news affected them emotionally and that it can make people feel more (or less) empowered to take action on issues or problems they see mentioned in the news.

In conclusion, Craft et al. (2016) emphasize that, contrary to findings from some earlier studies, all of these teens are at a good beginning stage to develop news literacy and to become civically engaged. They offer three suggestions for educators:

1. Although teens are incidentally exposed to news, they need instruction on purposefully looking for news that will enable them to reach their goals;
2. As the teens felt that the news was primarily oriented toward conflict and of limited personal relevance for them, educators should encourage them to investigate the potential reasons for this primarily negative orientation and why they do not find such news to be valuable; and
3. Educators should teach students about news production and the various types of factors that influence the creation of content that appears in news stories.

## **CONCLUDING THOUGHTS**

In this chapter, we have explored the sub-area of information behavior frequently referred to as youth information behavior. Although youth information behavior remains just a small proportion of the information behavior literature, it is a rapidly growing area. Having an awareness of the specific information needs of youth, their information-related preferences, and of the ways in which they search for and assess information can help to inform the design of information resources, information literacy classes and programs, and information devices, platforms, and systems. In turn, better tailoring the design of information resources, classes/programs, devices, platforms, and systems to the information-related needs, preferences, and practices of youth can help to facilitate their information-seeking and assessment processes. And, as they are able to more effectively and efficiently fulfill their information needs, they will have more time and energy to focus on putting the information they obtain to good use.

## DISCUSSION QUESTIONS

- Throughout this chapter, we have seen the importance of social factors in young people's information behaviors. Thinking about a recent situation in which you needed and searched for information, what types of social factors do you feel influenced your information behaviors? For example, were you alerted to an information need by a friend? Were you persuaded to consult (or not to consult) a particular source by a friend, parent, or teacher?
- What are some possible explanations for the relative lack of studies focusing on youth information behavior (and, particularly, teens or preschoolers)? Why do you think that this subfield has witnessed substantial growth over the past two decades?
- Select one of the twelve studies described in this chapter and describe your thoughts about the recruitment, data collection, and data analysis methods used by the researcher(s). Do you buy their findings? Why or why not? If you were to conduct a similar study, what would you change, if anything, about their methods?
- Design a study to investigate the information behaviors of a particular youth population (e.g., middle-school students, ninth-graders). Once you have selected a particular population, think of one or two research questions that you would like to investigate. How would you go about recruiting participants and gathering data that would enable you to answer your research question(s)? Why would your selected methods be ideal for your investigation? Why is it important to answer the research question(s) you've posed?
- Thinking about the information science career you're planning to pursue, can you think of any way(s) in which youth information behavior might be of relevance to you? If so, what difference might it make for you to learn or know about the information behaviors of your target customers and users?

**Learning Activity:** Select one of the stories at the beginning of this chapter. Keeping in mind Dr. Zelden's (or Jaxon Andrews') goals for their research, what do you think of the research methods they employed? Can you think of any ways of strengthening their studies in order to maximize the validity and reliability of their findings? What changes or additions to their methods would you recommend to them and why? What are some ideas for future additional research studies that may help to further their progress toward their goals?

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# 15

## *Legal Information Behavior and Access to Justice*

*Betty, a student at City College, signed a yearlong lease to rent an off-campus apartment. She skimmed the four-page lease before signing it but didn't read everything carefully. She was in a bit of a rush and, frankly, didn't understand all of the legal terms. A couple of months after she moved into the apartment, she rescued a 100-pound golden retriever, Thor, from the local shelter and decided it wasn't a big deal for Thor to live with her for a few months.*

*Betty was wrong. A week after Thor became her roommate, she received a letter (a "cure notice") from her landlord, stating that dogs more than twenty pounds were prohibited (per the lease), and she had two weeks to rehome the dog. Specifically, the letter stated that, "[f]ailure to remedy the situation within two (2) weeks will result in the filing of an eviction lawsuit." Betty was concerned when she read this letter but then got distracted by work and school. She forgot about the landlord's letter until she received something official-looking from the City District Court. Very nervous now, she opened*

*the letter and saw that it was a “Complaint for Tenant Eviction.” At the end of the complaint was the following language: “Plaintiff(s) demand judgement for possession of the property against Defendant(s), costs and attorney’s fees, if Plaintiff(s) represented by attorney.” Betty started to panic. What did any of this mean? Did she have to go to court? Was she going to go jail? Would she have to pay a lot of money? She didn’t have money to hire an attorney and definitely didn’t want to talk to her parents because they would be upset that she let the situation get so out of hand. Betty suddenly found herself trying to navigate a legal system that was scary and confusing. All of those hours spent watching shows like “Law and Order” did not prepare her to deal with this predicament!*

\* \* \*

You may remember that, in [Chapter 12](#), we talked about everyday life information seeking (or ELIS). Betty’s situation fits within the ELIS framework. She needs information to help her address a challenge that she is facing in her day-to-day life. You may also remember that, in [Chapter 5](#), we talked about information literacy. A key aspect of information literacy is the ability to understand the information so that you can use it. Betty finds herself in a situation in which the legal information she has received is difficult to understand and so she is struggling to work through this frightening everyday life challenge (no longer having a place to live).

If someone were to ask you to list the different types of information you use in your daily life, legal information likely would not be the first thing to spring to your mind. Legal information is something that you only need to think about when something goes terribly wrong, as it did in Betty’s case, right? Her situation, however, is in no way unique. Although legal troubles certainly create the need to be able to locate, use, and understand legal information, it’s not always quite that dramatic. For example, when you are purchasing a new television subscription service, there is likely a paragraph or two (often titled

“terms of use” or “terms and conditions” or something similar) that you need to indicate that you’ve read before you can complete the transaction. There’s a good chance that you skim the information and do not even think twice before you check the box. Those paragraphs, however, outline your legal rights and responsibilities. They lay out what you must do when you want to cancel the service (including whether penalties apply) and, in agreeing to these paragraphs, you may very well be agreeing to submit to binding arbitration in the event of a dispute. And, there’s a good chance that you don’t fully understand what binding arbitration means! (Note: In case you’re wondering, it’s a way to resolve a dispute in which the parties agree to abide by the decision rendered by a mediator, rather than litigating the matter in court.)

As another example, let’s say that you are doing a presentation for a class and, as you’re working on it, you remember that your professor said that she wanted your slides to be “visually interesting.” You find a couple of pictures online that you think would work well but you keep coming across some language that is mildly concerning to you: “Images may be subject to copyright.” You’ve heard about copyright violations (most recently when your favorite YouTube video was taken down for using a popular song without the artist’s permission). However, you don’t know how this applies to your work or how you would go about figuring out if the picture you’d like to use is subject to copyright. You certainly do not want to get arrested for adding a picture of the “World’s Cutest Fat Cat” to your presentation, but you also have no idea why anyone (even the cat!) would object to your using it for your class presentation.

These are just two examples of the ways in which the average, ordinary person deals (or not) with legal information in their everyday life. With these examples in mind, in this chapter, we will discuss:

- the concept of legal information literacy;
- barriers to accessing legal information;
- the importance of “plain language”; and
- the role of self-help services in overcoming barriers to access of legal information and even to justice itself.

## **“THE LAW” AND LEGAL INFORMATION LITERACY**

Often, discussions about legal information focus on “the law,” as if it is a unified body of knowledge that can be accessed in one place. In reality, however, it is a much more complicated situation. At the broadest level, laws can be divided based upon level of government. In the United States, the structure includes federal (e.g., anti-terrorism laws, such as the USA PATRIOT Act), state (e.g., laws about child custody and divorce), and municipal (e.g., laws about keeping your dog on a leash). Laws can further be broken down into statutory laws (which are enacted by the relevant legislative body) and case law (also known as “common law,” which is made by judges as they rule on cases). Also within the universe of the law are regulations, rules, orders, and other actions designed to aid in the implementation of laws created by the legislative and judicial branches.

When we use the term “legal information,” we are talking not only about these primary sources of law but also about the various resources that have been created to help people learn about, better understand, and/or use the law. Such resources run the gamut from scholarly articles on specific legal issues published in law reviews (primarily intended for lawyers and law students who have a baseline knowledge of the law) to online tutorials designed to help members of the public feel more comfortable when they have to appear before a judge. It is a broad and complex universe, in which people with quite different levels of knowledge and comfort can find themselves. The fact of the matter is that legal information is not only used by lawyers and others (such as paralegal associates) who have received training in finding, reading, and applying legal information. Because the population of potential users of legal information is large and diverse, those who create this information should be cognizant of the varying literacy levels of these users.

As such, in thinking about legal information literacy, it’s important to think about whether individuals with little familiarity and understanding of the law can understand the information, whether it is a law enacted by the legislature, an article written by a renowned legal scholar, or a

pamphlet prepared by a nonprofit organization (Ledray, 2013; Tait, 2011). A common problem, however, is that the individuals creating the legal information often have legal training and perhaps years of legal experience as well. Because of their backgrounds, it may be difficult for them to put themselves in the position of laypersons:

The inherent bias of legally trained professionals is towards the use of familiar and precise legal terminology because specific legal terms are used in statutes and case law and have acquired an accretion of accepted meaning and nuance that seems difficult or impossible to convey in a few words of plain English. The legally trained mind seems invariably to favor precision in legal meaning over general understandability when choosing the words to use in a form (Greacen, 2011, 23).

Legal terminology – such as the phrase “terms and conditions” discussed earlier – can be like a foreign language to anyone who hasn’t received legal training. If an individual cannot understand what they are reading, they are likely to stop reading (Mindlin, 2005). And this is precisely why Betty didn’t do anything with the notice from the court, why users often agree to terms and conditions that they have not read, and why many people assume that certain laws (like copyright) do not apply to them.

Like Betty, people who need legal information often have no experience in this area. This lack of experience may make it difficult for laypersons to process any information they read due not only to unfamiliarity with legal jargon, but also to information anxiety, information overload, and the like. We may struggle to sort through the information and find ourselves unable to determine what is relevant and important (Tait, 2011). Left alone to our own devices, we may not know what action is expected or required of us. We may end up doing nothing, which can create a whole new set of problems (Cohen & Weiss, 2009). Betty may find herself not only without a place to live, but also in danger of being fined for failure to appear in court. Similarly, the user of a subscription service may find himself locked into an ironclad contract for a much longer period of time than they had realized. And the student using the copyrighted image may get a “cease and desist” letter if she ends up posting her presentation on a social media site.

The fact that laypersons are unfamiliar with legal terminology is only part of the problem, however. The legal system is not user friendly for people like Betty, despite the fact that the number of people who find themselves navigating the system without a lawyer (commonly referred to as “self-represented litigants”) has been steadily increasing throughout the twenty-first century (Zimerman & Tyler, 2010). More specifically, there has been a steady increase since 2002 in the number of self-represented litigants in certain areas, such as family law, landlord/tenant, and small claims cases (Johnstone, 2011; Staudt & Hannaford, 2002).

Self-represented litigants are often required to use specific forms and are always required to follow formal rules of procedure governing court proceedings, such as service of process (how you notify the other party that you’ve initiated court action), preparation of orders (how the court instructs a party to do or not do something), and enforcement of judgments (how you can ensure that the other party complies with the court’s decision). Because the legal system’s rules and procedures were not designed to meet the needs of self-represented litigants, it can be very difficult for this group of users to reconcile these rules and procedures with how they act in everyday life (Zimerman & Tyler, 2010). For self-represented litigants, the legal terminology used throughout forms and rules of procedure can render them unusable. An individual may struggle with finding the form that applies to his situation or with completing the form, particularly if there are no clear instructions (Owens, 2013). As described by Greacen (2011):

The form identifies the information needed to request a particular form of legal relief, but does not provide the litigant with the ability to assess whether s/he has adequate grounds to obtain that relief, how to pursue the matter within the court once it has been filed, or how to obtain satisfaction or enforcement of a judgment if one is obtained. In effect, the provision of a form enables a litigant to open the front door to the courthouse, but does not help her or him to decide whether to open that door or, if the door is opened, how to proceed through the courthouse and to exit the court with an enforceable remedy (p. 9).

As a result, self-represented litigants often feel confused as they are trying to navigate the system and later feel frustrated when they feel as though the court is mistreating them (Rasch, 2011). This bad

situation is further compounded by the fact that, because self-represented litigants have no legal writing experience, their pleadings are often emotional and do not adequately contain the assertions of fact that the court is looking for. Self-represented litigants are more likely to state their claims using language with which they are comfortable, such as by using a narrative approach to tell their story. With this approach though, they may leave out important information, which may lead to a negative outcome in court (Schneider, 2011; Zimmerman & Tyler, 2010).

## **OVERCOMING BARRIERS TO LEGAL INFORMATION ACCESS**

Two recent sets of initiatives – the use of plain language in legal materials and the development of self-help services – have been instrumental in helping to diminish the barriers to legal information access experienced by lay people.

### **Plain Language Materials**

The Plain Writing Act of 2010 defines plain language as “[w]riting that is clear, concise, well-organized, and follows other best practices appropriate to the subject or field and intended audience.” In 2005, Mindlin conducted a quantitative study to build upon anecdotal evidence that plain language court forms are more readable and more likely to be read. Finding a statistically significant difference in readability and reading interest as measured by readers’ perceptions of the level of difficulty posed by the forms, Mindlin concluded that the plain language forms were easier to understand and more completely understood by readers. In addition, Mindlin suggested that courts will also benefit from increased use of plain language forms, as self-represented litigants will be more successful in filling out forms that they can actually understand (thereby easing the burdens on judges and the clerk’s office to try to rectify litigants’ errors). Moreover, as observed by Dyer et al. (2013), the use of plain language forms enhances the legal system’s ability to serve limited English proficiency

(LEP) individuals: “It has also been shown [by Mindlin] that interpreter services can be conducted with [40%] less expense when translating plain language forms, as compared to other forms” (pp. 1086–1087).

Although there are no specific standards governing the readability of forms and other legal materials, online guidance is available at <http://plainlanguage.gov> and [www.writeclearly.org](http://www.writeclearly.org). Different opinions have been expressed with respect to the appropriate reading level to target when writing for legal self-help users. For example, one noted legal scholar, John Greacen (2011), advocated for forms to be written at a third-grade level, while the Maryland Access to Justice Commission (2012) has suggested that an eighth-grade level is acceptable given the inherent complexity of legal language. To ensure that materials are at an appropriate reading level, Cantrell (2002) recommended conducting readability evaluations so as to provide “some assurance at the outset that a potential client will be comfortable with the materials. Then, clients can be interviewed after they receive or use materials as a double check evaluation on the accessibility of the materials” (pp. 1586–1587). According to Dyer et al. (2013), twenty-four states currently have extensive plain language court forms for use in family law and other types of cases, with fourteen of these states mandating the use of such forms.

Each of the following suggested practices identified in the literature can increase the readability of written legal information:

- Use of familiar words and phrases, rather than foreign, archaic, and noun-heavy phrases (Dyer et al., 2013; Mindlin, 2005) (e.g., “divorce” rather than “dissolution”; “obey” rather than “comply with”; “rules” rather than “provisions”);
- Use of active voice and direct address (Dyer et al., 2013);
- Explanation of specialized terms (Maryland Access to Justice (“A2J”) Commission, 2012; Mindlin, 2005);
- Use of readability tools to check reading level (Maryland A2J Commission, 2012); and
- Incorporation of visual aids to improve readability of layout (Gordon, 2001; Maryland A2J Commission, 2012).

## **Self-Help Services**

In response to the increase in self-represented litigants, courts, other government agencies, and legal services, organizations have developed a variety of self-help services. In general, through these self-help services, courts and other organizations seek to provide access to information about the law itself (e.g., landlord-tenant law), as well as about applicable legal processes and procedures (e.g., whether Betty needs to appear in court). Tait (2011) provided us with another way to think about legal information for self-help litigants, laying out three categories of information needs:

- *Informing litigants*: Provide orientation and general background information about courts; offer general guidance in navigating the court system.
- *Assessing legal options*: Help self-represented litigants understand their specific situation; inform individuals about alternatives to litigation; inform individuals about the implications of proceeding without representation.
- *Pursuing the case*: Assist with the process of filing court documents; provide information on follow-up events; assist with resolution and enforcement.

Courts' progress in this area has been rapid with Spieler (2013) noting that (1) almost every state court system now provides some court forms and basic information through its website (e.g., [www.nycourts.gov](http://www.nycourts.gov), the home of the New York State Unified Court System), and (2) more than two-thirds of state court systems provide services to the public, including self-represented litigants, through at least one staffed center located in a courthouse.

Self-help centers provide legal information on a one-on-one basis or through workshops. An increasing number of states maintain a network of self-help centers. For example, a directory of self-help centers located throughout the State of Illinois is available at <https://www.illinoislegalaid.org/get-legal-help/lshc-directory>. These centers often provide assistance through volunteer or paid staff

attorneys (Schwarz, 2004). In this setup, the attorneys do not provide legal advice (which is focused on the individual's specific situation), but rather answer basic questions and guide self-represented litigants through the process of completing forms (Fritschel, 2007; Self-Represented Litigation Network, 2008). In addition to in-person assistance, self-help centers often maintain computer terminals as well as a collection of plain language self-help materials, including explanations of court processes, instructions for filling out forms, and pamphlets that explain how to bring common causes of action (Clarke & Borys, 2011; Greacen, 2011; Rhode & Bam, 2012). In providing these services, careful consideration is given to the specific needs of the community, with particular attention paid to vulnerable populations, including limited English proficiency (LEP) and rural populations (Rhode & Bam, 2012). Self-help centers also often involve coordination with judges and their staffs:

If self-help centers and the judges communicate about procedures and the types of facts that judges will take into consideration, handouts can be created and litigants will have been told or informed of many of these things at different times, in different settings, and by different methods. This will reinforce the information and help create consistency so that litigants will know what to expect (Judicial Council of California, 2007, 6–22).

Public libraries and public law libraries also play an important role in the provision of self-help services (National Center for State Courts, 2012; Zorza, 2010). Public libraries are more likely to be the initial point of contact; however, public library staff may lack the necessary skills and experience to facilitate self-represented litigants' access to legal information (Fritschel, 2007). Public law library staff are much more comfortable navigating the legal system. They are well-versed in the law as well as tools and resources that can help self-represented litigants understand the law; they understand the process of legal research; they can help users navigate the world of online legal information; they routinely make community service referrals; and they can navigate legal information websites (Self-Represented Litigation Network, 2008). Moreover, law librarians generally have a clear understanding of the distinction between legal advice and legal information (Pettinato, 2008). Public law libraries

exist throughout the country (e.g., a directory of Maryland Law Libraries is available at <https://mdcourts.gov/lawlib/using-library/for-librarians/maryland-law-libraries>); however, many members of the public do not even know of the existence of these important institutions.

A July 2014 white paper published by the American Association of Law Libraries (AALL) described several key benefits of housing self-help centers in law libraries:

The self-help center in the law library ... benefits from the additional resources and services of expertly trained information staff, computers, print, and online resources, often in multiple languages, which can be folded into services provided to the self-help center users, depending upon the user's needs. If someone visits a brief advice clinic held in the law library and the attorney volunteer recommends a certain form to be completed, the user can consult with the librarian about accessing and completing the form in the law library. The packaging of document assembly technologies with a self-help center depicts one of the unique strengths that law libraries contribute to centers located within them. Libraries that are more equipped both on the staffing and resource end can assist even more. Some law libraries provide scanners for patrons who must now e-file documents to the court (p. 26).

The reach of traditional, in-person self-help centers can be rather limited. In other words, if you cannot physically get to a self-help center, you cannot use its services. With the increase in self-represented litigants over the past twenty years, it became clear that alternatives were needed. The rapid development of the Internet during this time provided one such alternative. The potential of legal information websites (as well as other technology-based legal services) to provide assistance to a greater number of self-help users is clear (see, for example, Texas LawHelp [<https://texaslawhelp.org>] and Michigan Legal Help [<https://michiganlegalhelp.org>]); however, the delivery of legal information through information and communication technologies (ICTs) requires:

a capacity to access the system that some do not have – whether the capacity is financial, educational, technological, physical or mental, or geographical. When these access limitations outweigh the benefits of the technology, it defeats the goal of creating greater access to courts through the use of technology (Zorza & Horowitz, 2006, 249).

Many self-help users contend with multiple disadvantages that may limit their ability to access legal information available online (Van

Wormer, 2007). In addition to limited legal information literacy skills, users may lack digital literacy skills, as discussed in Chapter 5. Individuals with limited English proficiency (LEP) face an additional hurdle, as an estimated 55.5 percent of all online content is in English (<https://unbabel.com/blog/top-languages-of-the-internet>).

Notwithstanding these issues, legal information websites have become an important tool for providing assistance to self-help users. The use of Internet-based materials clearly has advantages over print materials to the extent that they are less expensive to produce, as well as more efficient to disseminate and update (Ledray, 2013; Scott, 2000). They also allow for easier integration of content produced by courts, legal services providers, and other sources (Ledray, 2013). But, as noted by Smith (2013), “[d]elivery systems are only a means to an end. There is no escaping the fact that the best websites ... have the best advice both in terms of ... substantive content and practicality. This is absolutely crucial and is an expression of the ‘gold in; gold out: rubbish in; rubbish out’ principle” (p. 2). Moreover, given the fact that laws change, legal information websites need to be reviewed on a regular basis to ensure that their content is up-to-date and accurate.

In addition to the content itself, it is important to consider the way in which information is presented – in other words, will it make sense to users of the website? Developers of legal information websites are increasingly realizing the importance of gathering input from users during the process of website design. Herman (2007) suggests that data can be collected about user needs and preferences in a variety of ways:

An accurate assessment of what the user really needs from your Web site, knowing what the user cares about the most, using the right words, and a less-is-more approach to Web site design will increase the chances that your Web site will meet the exact needs of your user. Utilizing caseload statistics and information from court staff to pinpoint the greatest need provides a starting point for developing on-point Web content. Data on user needs can also be gathered through surveys, focus groups, or an online user-feedback tool. Involving court staff, community stakeholders, and the self-represented themselves in the development of content will help to ensure useful Web sites that will meet the ongoing information needs of this audience (p. 30).

In general, visitors to legal information websites are looking to solve a specific problem (Scott, 2000). As such, in order to be digestible by self-help users, the information should be structured in a way that walks them through the process of solving the problem that brought them to the website in the first place:

It is becoming widely accepted that legal guidance needs to be orientated towards 'life episodes' rather than traditional legal categories .... These are important first steps, but much more is needed. While guidance has to be as simple as possible, it should be no simpler. So, guidance should integrate as much knowledge and know-how as is necessary in a practical, step-by-step approach to enable self-helpers to solve their legal problems (Widdison, 2013, 3).

The use of hypertext links supports this step-by-step approach, while also preventing users from being overwhelmed by too much information at any one time (Greacen, 2011). This approach can also incorporate a continuum of resources to better serve the needs of users with varying levels of understanding, from plain language materials to more sophisticated resources (Greacen, 2011). Moreover, legal information websites make it easier to combine text, graphics, and multimedia elements, and doing this is one way to assist users who struggle with basic literacy. According to the National Center for Education Statistics (n.d.), those who lack basic prose literacy may not be able to read or understand any written information or may only be able "to locate easily identifiable information in short, commonplace prose text in English, but nothing more advanced." As described by Widdison (2013):

For the substantial proportion of the population with limited literacy skills, sole reliance on text is a major additional barrier. In a multimedia digital environment such as the Internet, purely textual representation is entirely unnecessary .... Appropriate use of graphics in the form of diagrams and flowcharts can greatly improve the understanding of accompanying text. Images in the form of photographs and illustrations not only support text, they can sometimes substitute for it e.g. with a 'comic-book' format. Sound bites may sometimes have a useful role to play. Best of all, surely, are video clips that e.g. provide short lectures in lay terms on relevant issues, or show other self-helpers going through the various stages of a problem solving strategy (p. 4).

Even with plain language content and the integration of multimedia content, users may still struggle with understanding the available information, due to the inherent complexity of law or to language

barriers. Legal information websites, however, do not need to be stand-alone resources. They can link users to additional sources of support and information through phone and/or chat services so that frustrated users do not abandon their pursuits (Ledray, 2013; Smith, 2013).

The process of designing legal information websites should also involve consideration of accessibility issues (e.g., compatibility with assistive technologies) so that everyone (including individuals with disabilities) has effective access to the information on the website (Berkman Center, 2010; Birnbaum & Bala, 2012). The recent rise of mobile technology presented another opportunity for courts and legal services organizations to evolve to better meet the needs of self-help users. According to Pew Research Center's Mobile Fact Sheet (published in June 2019), 81 percent of Americans now own smartphones. This represents a dramatic increase from the 35 percent reported during the Center's first survey of smartphone ownership conducted in 2011. In 2013, Pew reported that smartphones are more likely to be a main source of Internet access for certain demographic groups that have traditionally found themselves on the wrong side of the digital divide – young adults, minorities, those with no college experience, and those with lower household income levels (Duggan & Smith, 2013). Recent Pew Research Center research reveals that this remains true today. For example, “[a]s of early 2019, 26% of adults living in households earning less than \$30,000 a year are ‘smartphone-dependent’ internet users – meaning they own a smartphone but do not have broadband internet at home.”

A study conducted by Urban Insight (2016) found that nearly half (46 percent) of the traffic to legal services websites came through smartphones and tablets. Furthermore, increases in Web traffic are attributed primarily to mobile devices, while traffic from desktop users remains more or less stagnant. The prevalence of mobile devices thus mandates consideration of how to expand current technology-enabled self-help services to incorporate both texting and mobile applications (Ledray, 2013). In response to this shift, legal services websites gradually began adopting responsive design, with the

percentage of websites doing so increasing from 26 percent in 2014 to 42 percent in 2015 (Urban Insight, 2016). Also, because both reading and comprehension are more difficult on a mobile device, the importance of using bulleted lists, fewer words, and shorter paragraphs has become even clearer.

## **CONCLUDING THOUGHTS**

Let's return to Betty for a moment. Assuming that she does not hire a lawyer, how should she proceed? Betty has several avenues available to her; for example, she could (1) contact City Court to see if they have a self-help center or (2) look for a legal information website that will help her better understand her rights and responsibilities as a tenant, as well as the actions that she should take going forward. Her digital literacy and legal information literacy levels will impact the extent to which she's able to take these actions and to use the information she locates. If she decides to look for information online, the content and design of the website will also impact her experience.

Given the complexity of the legal system, the use of legal information by laypersons will likely always present challenges to some extent. A growing recognition of the importance of assessing user needs, however, will ensure that future legal information resources and services will be better designed to help everyone who needs them.

## **DISCUSSION QUESTIONS**

1. Can you think of additional examples of legal information that you use in your everyday life?
2. If you were going to design a self-help center or a legal information website, how would you go about determining the best design, structure, content, and organization for the center or website?

3. How would you structure a study looking to assess the extent to which a legal information website meets the needs of self-help users?
4. Thinking about the information science career you're planning to pursue, do you think you will be working with any specialized type(s) of information that are difficult for the average layperson to understand? If so, what are some ways that you might be able to increase the physical and intellectual accessibility, as well as the usefulness, of this information for all of your target users?

**Learning Activity:** Each state now maintains a self-help legal information website; links to each website are available at <https://www.lawhelp.org/find-help>. Visit the website for the state in which you currently live. Are you able to find information that would help Betty better navigate her current predicament? Is the site easy to navigate and user friendly? Do you think that a typical college student would be able to understand the information available on the site?

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# 16

## *Information Behavior in Libraries*

*During his first semester at Beach State College, Arnold O'Brien was taking a required English class in which he had to write a research paper. About halfway through the semester, his professor scheduled a class session at the library so that the students could learn more about the databases and other resources offered there. While walking to the library on the day of the session, Arnie realized that he couldn't remember the last time he had actually used a library. In high school, he and his friends would meet at the school library in the morning to hang out for a few minutes but that was about it. During the session with the librarian, he was surprised to learn about all of the different resources he could access – both print and online – and appreciated the librarian sharing different tips for searching for information.*

*The librarian who led the session, Agnes Piazza, has been working at Beach State College since she graduated with her Master of Library Science (MLS) degree in 2000. She loves her job, particularly the time she spends working with students, and can't imagine doing anything else. And this is one of the reasons why it*

*confuses and upsets her when people say things like “Who goes to libraries anymore? You can find all of the information you need on the Internet now!” Agnes’ library is neither empty nor quiet and, in fact, in recent years, she has been working with a growing number of professors on campus to help students develop their information literacy skills. Yet she notices that many students are reluctant to ask library staff for assistance and is trying to develop new ways to connect with students to make them aware of all the resources and services that the library provides.*

\* \* \*

Like Arnold, perhaps you haven’t made regular visits to the library in recent years as so much of the information you want and need can be accessed via your computer or phone. And you too may have to think back to your childhood to recall your most recent library experience. As we’ve discussed, however, library science and information science are closely related disciplines and a lot of what we know about information behavior came (at least originally) from studies of library users. Given that one of the primary purposes of libraries of all types is to promote access to information, it makes sense that many of the studies we’ve discussed throughout this book focus on library users. For example, Brenda Dervin (whose work on sense-making we discussed in [Chapter 12](#) often focused on public library users. As Talja and Hartel (2007) noted, “[i]t is in this particular context that [Dervin] advocated the idea that the library should not be the central object of study in itself, but information needs as they are experienced and faced by individuals in diverse life situations.” Moreover, library use continues to be a fertile ground for information behavior research today, particularly in the context of how specific different groups (e.g., teenagers, older adults, recent immigrants, individuals seeking employment) use the library.

There are, in fact, many different types of libraries, ranging from the public libraries that serve their surrounding communities to school

libraries in K-12 settings to academic libraries that serve students, faculty, staff, and researchers on college campuses to special libraries located within larger organizations (such as law firms, hospitals, or government agencies). Here, we will focus on the first three types (public, school, and academic libraries) as those are the ones that you are likely to be familiar with and/or the ones to which you currently have access.

This chapter will first review several key concepts of information behavior within the context of library use. The phenomenon of library anxiety – something that many of us have experienced! – will be highlighted. We will then examine a selection of studies of library users and library use that focus on the role of the library in people's lives today. The chapter will conclude with a discussion of how research on library use and users intersects with two key topics presented in depth elsewhere in this book: information literacy (Chapter 5) and user experience (Chapter 11).

## **THE INFORMATION BEHAVIOR OF LIBRARY USERS**

According to the American Library Association (ALA) (2019), there are 9,057 public libraries, 3,094 academic libraries, and 98,460 school libraries located throughout the United States. Overall, these institutions serve a wide array of users. Public library users, in particular, are a diverse, heterogeneous group, representing different cultures, professions, ethnicities, generations, and socioeconomic levels (Aabø & Audunson, 2012; Saunders & Jordan, 2013). A 2016 study conducted by the Pew Research Center found that 53 percent of Americans had either visited a public library in person or used a library website or mobile app in the previous year. Borrowing print books remains a very popular activity among public library users (Horrigan, 2016). Other common activities include sitting and reading, studying, and watching/listening to videos. Library computers are most frequently used to do research for school or work, as well as to check email, obtain online health information, and to take online classes.

In contrast, academic and school libraries have generally experienced a decrease in the circulation of materials in recent years. In the case of academic libraries, the primary causes have been the parallel growth of e-books and the Internet (Kurt, 2012). Although school and academic libraries continue to maintain print collections, they have also recognized students' growing preferences for online information, leading to an ongoing dialogue about their ability to adapt to this new information environment. "Since the 1980's libraries had been moving to a more patron-centric, learning-centered, and user-friendly model" (Heitsch & Holley, 2011). This approach, often referred to as a learning commons model, shifts the focus from the resources to the users and their needs. It finds support in research studies that not only confirm college students' continued use of the library to study and otherwise engage in academic work, but also document their preferences for comfortable seating, large tables, whiteboards, office supplies, and computer equipment (Cunningham & Tabur, 2012). The shift to student-centered learning led to new roles for the librarians who work in these institutions. As described by Hadler (2016), librarians are now less likely to view themselves as "gatekeepers" of information, instead welcoming the opportunity to serve as "connectors and instructors on how to use advanced technology to accumulate knowledge."

Despite the different functions that public, school, and academic libraries perform, there remain similarities in terms of the information behaviors exhibited by their users. Browsing and information encountering – both of which are discussed in [Chapter 4](#) – frequently occur in libraries. Both of those concepts involve "bumping into" information that you were not necessarily looking for. As information-rich environments, libraries present many opportunities to find information that addresses a need different from the one that brought the individual to the library in the first place. Erdelez (1999), for example, presents the scenario of a student going to the library to find information for a term paper due in one class and encountering information that is relevant to a research project in another class.

Notwithstanding a growing preference for online information, libraries continue to encourage users who walk through their doors to

browse their print collections. Some of you may remember going to the library during elementary school and perusing the shelves, without a clear idea of what you were looking for. In recent years, school libraries have started using “genrefication” to increase use and enjoyment of their print collection (Witteveen, 2019). This approach involves grouping “like with like” (e.g., science fiction/fantasy books, historical fiction, graphic novels), rather than using a classification system like the Dewey Decimal system. “Many librarians say the ‘search hurdle’ imposed by Dewey classification (a system originally designed for adults) significantly reduces the odds of a child finding something new they’re likely to enjoy. In a genrefied library, on the other hand, a young reader standing near a favorite book need only stick out a hand to find more like it” (Cornwall, 2018). In other words, this newer approach promotes browsing and may lead to the serendipitous finding of information. The study conducted by Taylor, Hora & Krueger (2019) (discussed in [Chapter 14](#)) found that genrefication of a library collection has a positive impact on student learning.

Notwithstanding Dervin’s suggestion that the library itself should not be the central object of study (as noted by Talja & Hartel [2007]), the extent to which the design of a library facilitates users’ information-seeking behavior has been of particular interest to some researchers. As explained by Eaton (1991):

Library buildings, of course, house recorded information.... At the same time, users are affected, consciously or unconsciously, by messages coded in the building itself, in its architecture, decor, lighting, and furnishings, as well as in its signs. Communication has both cognitive and affective elements, and the ideal library building should convey both intellectual and emotional support to its users” (p. 519).

In terms of providing access to their resources, libraries can foster – or alternatively, impede – a user’s information-seeking experience through their wayfinding systems. Such systems help users navigate physical environments, using visual clues to enhance their experience. Well-designed wayfinding systems are thought to contribute to users’ sense of well-being, safety, and security (Society for Experiential Graphic Design, n.d.). In other words, are there signs to help people locate resources? Are different sections or departments of the library

clearly marked? When libraries fail to give proper consideration to wayfinding, it has a negative impact on users; they may get lost and frustrated, choosing to give up before they find the information they are looking for. As Mandel (2013) noted, the building itself is “the physical expression of the library’s mission and purpose, to provide information and services to users. If users cannot access and use the facility effectively, then they also cannot access and use the library’s resources and services” (p. 264).

Being able to navigate the library, however, is only one element of a library user’s information-seeking experience. Earlier in the book, we described Carol Kuhlthau’s (1999) Information Search Process (ISP) model and the related concept of “zones of intervention.” To briefly review, the ISP model explains the thoughts and feelings that arise when someone is looking for information; the “zones of intervention” are those times during the research process when the assistance of an information professional would be most beneficial. Although her initial research focused on the experience of high school students writing a research paper (not too different from Arnold’s situation), Kuhlthau’s later studies involved academic and public library users as well (Genuis, 2007).

Other researchers have also used the ISP model to learn more about library users’ information behavior. For example, Kracker (2002) found that teaching undergraduate students about the ISP model could reduce the anxiety that novice researchers often experience when working on a research paper assignment. Moreover, application of the ISP model has led to the adoption of more user-centered approaches throughout libraries, from the design of information retrieval systems to the format of instructional sessions (Kuhlthau, 1999).

In thinking about the affective dimension of the ISP model (i.e., the feelings you experience during the research process), it is clear that people often go through a roller coaster of emotions, ranging from uncertainty when they are first beginning a task to frustration when they are unable to locate relevant information to relief when everything starts to come together for them. Whether you are looking for information to write a research paper or to satisfy an everyday life

information need, the range of emotions is similar, and the negative emotions (uncertainty and confusion, as well as frustration) can act as barriers to information access. For some users, the situation is further complicated by a phenomenon known as library anxiety (Mellon, 1986). As described by Nunes (2016), “[i]t’s the feeling that one’s research skills are inadequate and that those shortcomings should be hidden. In some students it’s manifested as an outright fear of libraries and the librarians who work there.” Mellon (1986) found that a large percentage (75–85 percent) of students experienced fear and anxiety when working on an assignment that required library use. Bostick (1992) identified five factors that contribute to library anxiety:

- Barriers with staff: Does the user perceive of the staff as unapproachable or too busy?
- Affective barriers: Does the user have a sense of adequacy when it comes to using the library?
- Comfort with the library: Does the user perceive the library as a welcoming and safe place?
- Knowledge of the library: Does the user feel sufficiently comfortable with using the library’s resources and services?
- Mechanical barriers: What feelings emerge as a result of a user’s reliance on library equipment? (Van Kampen, 2004).

Library anxiety can lead to people *not* using a library’s resources or services. They will choose instead to use resources that are more easily accessible to them, which encourages satisficing. In addition, even if someone does step foot in a library or use a library database, they may be reluctant to ask a librarian for much-needed assistance (e.g., when using a database for the first time), which can make the search process more difficult than it needs to be. And, because the search process becomes arduous, people become increasingly frustrated and may, in fact, end their search before they have satisfied their information needs. The reasons for library anxiety are multifold. For example, think about Robert Taylor’s (1968) work on question negotiation (discussed in [Chapter 9](#)). A person’s inability to articulate their information need may make them unlikely to approach

a librarian for help; they may not want to risk embarrassment by stumbling over their words or otherwise being unable to describe what they are looking for.

## FOCUSED LIBRARY USER STUDIES

As mentioned earlier in this chapter, there is certainly no shortage of research studies focused on library users. Because of the sheer size and diversity of this user group, researchers often focus on a specific subset of library users who have particular information needs and/or face particular barriers to information access. For example, the role of the public library in the life of immigrants has been a rather frequent subject of study. As observed by Audunson, Essmat & Aabø (2011), public libraries:

have a potential for providing immigrants with information they need to adapt to the new circumstances.... with the opportunities of keeping in touch with their culture of origin.... [and] they have the potential for being a meeting place capable of creating communication and bridging between the minority cultures and the majority cultures (p. 220).

Public library use by immigrants and refugees has also been studied by Branyon (2017); Burke (2008); Johnston (2016); Sirikul & Dorner (2016); Shepherd, Petrillo, & Wilson, (2018); and Vårheim (2014), among others. In a similar vein, researchers have explored the role of the academic library in the life of first-generation college students (e.g., Arch & Gilman, 2019; Parker, 2017; Pickard & Logan, 2013; Talley, 2020) as well as the role of the school library in the lives of English as a second language (ESL) learners (e.g., Dame, 1994; Fu, Houser & Huang, 2007; Lambson, 2002).

Other researchers focus on library users' information-seeking activities in specific topic areas, such as employment and career assistance. The consistent finding of increased use of public libraries during economic downturns dates all the way back to 1880 in the United States; this trend has been called the "Librarian's Axiom" (Bertot, Real, & Jaeger, 2016). According to the 2014 Digital Inclusion Survey, when unemployment rates are high in the United States, public libraries' career services (e.g., assistance with online

applications, résumés, and cover letters; training for employable skills) are in high demand (Information Policy & Access Center, 2015). During the Great Recession (December 2007 through June 2009), for example, more than 30 million people reportedly used public library computers for employment-related activities (Becker et al., 2010). A nationwide study conducted by Holcomb, Dunford & Idowu (2019) found that the most commonly offered services were “testing and career preparatory software, technology classes and training, [and] access to databases and learning materials … which enable library patrons to develop skills needed for employment.... as well as for lifelong learning purposes” (p. 7). Other studies have focused on how libraries can meet the information needs of specific segments of the workforce, such as entrepreneurs (Hoppenfeld & Malafi, 2015; Tully, 2019) and small business owners (MacDonald, 2015; Pryor, 2014).

## **NEW APPROACHES TO STUDYING LIBRARY USERS AND USE**

Similar to the way that library services and resources change to meet the needs of individuals and communities, the aspects of library use that interest researchers have also evolved over time. Two recent trends related to library use – information literacy instruction and the application of user experience methods to the design of library services and space – aptly demonstrate libraries’ strong commitment to assessing and helping to fulfill user needs.

### **Information Literacy Instruction**

In [Chapter 5](#), we explored the concept of information literacy. As you may recall, librarians who work in school and academic libraries are often involved in teaching information literacy. Information literacy instruction has traditionally focused on helping people learn how to conduct research for papers and projects in a classroom setting. As a result, public libraries did not step into the arena of information literacy instruction until the “internet and information revolution ...

brought more and more non-library users into the [library] with the expectation that [librarians] will be the ones to take them through the waves of information that are inundating them" (Leininger, 2012).

This revolution encouraged libraries to more clearly define their role in supporting users' learning outside of the classroom. One early effort to better understand this role was a small-scale study of twelve Danish high school students (Nielsen & Borlund, 2011), which sought to learn more about whether the public library is perceived as a place for learning. The students considered the library to be not only an information resource center that provides access to both print and online information but also a place for independent learning, support, and guidance. Based upon these findings, the researchers argued that public libraries should continue to identify ways that they increase awareness and understanding of the importance of information literacy.

Recently, many librarians involved in information literacy instruction have been increasingly turning their attention to combatting the spread of misinformation and disinformation in the "real world" (as discussed in [Chapter 5](#)). Sometimes referred to as "fake news," this phenomenon is fueled by the fact that many people use social media to get and share information. According to a Pew Research Center report, 62 percent of US adults now get at least some of their news on social media (Gottfried & Shearer, 2016). This growth in social media use amplifies the issues related to credibility that we have previously discussed in this book.

A study conducted by the Stanford History Education Group revealed that the majority of elementary, high school, and college students are unable to adequately evaluate the credibility of information. The development of better information literacy skills is an information need that school and academic librarians are well equipped to meet, as evidenced by the variety of library-led projects and initiatives designed "to increase awareness of fake news and promote sustainable information seeking/evaluation practices" (Batchelor, 2017, 145). Examples include:

- A partnership between the ALA and the Center for News Literacy at Stony Brook University School of Journalism to develop a pilot program to train librarians to help adults develop their media literacy skills.
- The development of an interactive fake news website by librarians at Indiana University East that provides tips on fact-checking (Holmes, 2018).

As we write this chapter (spring 2020), some libraries are specifically trying to combat the plethora of misinformation connected with the COVID-19 pandemic. For example, Montgomery County Public Libraries in Maryland ran an online workshop (“Scams in the Time of COVID-19: A Virtual Session”) to help consumers to identify COVID-19-related scams (<https://mcpl.libnet.info/event/4274691>). Similarly, Denver Public Library conducted an online workshop, “How to Spot Fake News: The COVID-19 Edition” (<https://www.denverlibrary.org/blog/research/robin/how-spot-fake-news-covid19-edition>).

Librarians can offer invaluable assistance to efforts to stop the spread of misinformation and disinformation, using what they know about their users’ information behavior to help them become more thoughtful and conscientious creators and disseminators of information. For example, given their knowledge of many users’ reliance on social media, their workshops and other educational offerings often help individuals develop their fact-checking skills so that they can verify or refute claims that are shared by others on social media outlets.

## ASSESSING THE NEEDS OF LIBRARY USERS

As the research studies discussed throughout this book demonstrate, various methods have been used to learn more about the information behavior and information needs of library users. A recent development in this area has been to examine library use through the lens of user experience (UX), a concept discussed in [Chapter 11](#). Within the world of academic libraries, UX is typically discussed in

connection with online public access catalogs (OPACs) or database search systems (Bell, 2011). In an effort to broaden librarians' understanding of user experience, Bell adapted a survey designed to learn more about retail experiences, seeking to ascertain the qualities of a positive public library experience.

This approach allows for a deeper understanding of user needs, which then enables librarians to make decisions regarding space, collections, and services that will enable them to better meet those needs. According to Appleton (2016), UX methods employed in libraries include:

- observing user movements during their visits to the library;
- holding discussions with library users regarding what's working for them and what is not;
- encouraging users to keep diaries that allow them to reflect on their experiences;
- photo studies, where users take photographs to document important aspects of their lives and day-to-day context (User Experience Professionals Association, n.d.); and
- cognitive mapping, where users are asked to draw their experience of a library service (Priestner, n.d.).

UX research thus "allows managers and administrators to look at how and why library users use libraries in the way that they do (as opposed to the ways in which librarians think that they use them) in order to better understand what users want from libraries" (Appleton, 2016, 224). When UX principles guide the design of library services, what we know about library users' information behavior (e.g., convenience is a primary consideration) is of paramount importance (Walton, 2015).

Lamb et al. (2016), using ethnographic and UX methods, examined Cambridge University's Engineering Department Library. They were interested in learning more about the use of quiet and collaborative spaces within the library. Over a two-month period, the researchers conducted observations, interviews, and a cognitive mapping session. They reported four main findings: (1) physical space is in high

demand; (2) all physical spaces are used by a variety of users for a variety of reasons; (3) comfort, space, and suitability of furniture are important; and (4) it is impossible to predict how one will use space based upon their demographics. The researchers used their study findings to argue for the provision of amenities that would enhance user experience (e.g., water fountains, comfortable seating) as well as to confirm the librarians' expectations regarding user behavior in certain areas of the library (e.g., talking in the "collaborative space" is encouraged).

## CONCLUDING THOUGHTS

Because every aspect of libraries is so tightly connected with information, libraries and their users are ideal subjects for information behavior studies. As a physical space, libraries are a place where people come to seek information and where information encountering is encouraged. Moreover, it is difficult to think of a library service – whether face-to-face or online – that does not involve providing users with some kind of information. Library users are not a "one size fits all" group, representing many of the different user groups discussed throughout this book. Because of their diversity, the importance of assessing the needs of a *specific* library's users cannot be overstated. The published research is a great starting point but will not tell you everything you need to know about a particular library's users. From this foundation, however, you can begin to build a solid strategy for learning more about the needs and preferences of a specific group of library users.

## DISCUSSION QUESTIONS

- Are you a regular library user? Why or why not? Have you ever experienced anxiety when using the library and/or its resources?
- Thinking back to the scenario posed at the beginning of this chapter, what can librarians like Agnes do to help users overcome "library anxiety"?

- What role do libraries play in addressing the digital divide?
- What connections do you see between digital inclusion (Chapter 6) and fake news?
- If you were to conduct a research study to learn more about patrons' use of "quiet areas" in academic libraries, what research methods would you use? Why?

**Learning Activity:** Visit the website of either your local public library or your college/university library. Are you able to quickly identify the resources/services offered by the library? Is the website user friendly? What suggestions would you have for improving the website?

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# 17

## *The Information-Related Professions: The Underlying Thread of Information Behavior*

*One month after graduating with her bachelor's degree in Information Science, Lilia Moussa began a new position as a software developer/game designer with Diamond Dungeon Games. Although Lilia was new to this position and certainly had a lot to learn about designing and developing videogames, she brought some important knowledge to this position. In her senior year, Lilia had elected to do a thesis, focusing on the ways in which gamers go about learning about and selecting new videogames to try out, how they connect with other gamers playing the same games as them, what they enjoy (and don't enjoy) about videogames, and their ideas for new games they would like to play that haven't yet hit the market. To conduct her research, Lilia interviewed ten people who were playing the new hit videogame, Viral Vengeance, at least three times per week. She also used snowball sampling, asking her interviewees to invite people they played with to contact her so she could interview them, as well. In addition, Lilia conducted three*

*online focus groups, each one consisting of a group of gamers who played Viral Vengeance together at least once a week. Through her research, Lilia learned a lot about the interests, motivations, preferences, and information behaviors of Viral Vengeance players. As Lilia settled into her job, she was able to draw on this knowledge to help inform her design and development of new videogames for Diamond Dungeon Games, particularly ones that were targeting audiences similar to Viral Vengeance players.*

\* \* \*

In this chapter, we'll investigate the underlying thread of information behavior that runs through many (all?) of the various careers you might choose to pursue upon graduating from your degree program. Information scientists and other types of information professionals work in a wide range of careers, spanning areas such as cybersecurity/information security; data analytics/data science; information technology; librarianship/content development, organization, and preservation; social media; software development; and user experience. Sample job titles within each of these career areas are shown in [Table 17.1](#). Many of these jobs actually span multiple career areas. Also, individual job positions that share the same title may actually emphasize different areas. For example: A Web designer position may emphasize social media or user experience; a data analyst position may emphasize cybersecurity or social media; and a market researcher position may emphasize data analytics or user experience.

**Table 17.1. Sample Career Areas and Job Titles of Information Professionals**

Career Area	Sample Job Titles
Cybersecurity/Information Security	<ul style="list-style-type: none"><li>• Computer Security Specialist</li><li>• Cryptographic Vulnerability Analyst</li></ul>

	<ul style="list-style-type: none"> <li>• <b>Cyber Defense Technologist</b></li> <li>• Cyber Threat Analyst</li> <li>• Cyber Threat Intelligence Analyst</li> <li>• Data Security Administrator</li> <li>• Data Security Analyst</li> <li>• Information Security Analyst</li> <li>• Information Systems Security Manager</li> <li>• Network Security Administrator</li> <li>• Systems Security Administrator</li> </ul>
Data Analytics/Data Science	<ul style="list-style-type: none"> <li>• Analytics Specialist</li> <li>• Big Data Analyst</li> <li>• Business Intelligence Analyst</li> <li>• Competitive Information Specialist</li> <li>• Competitive Intelligence Analyst</li> <li>• Data Analysis Consultant</li> <li>• Data Analyst</li> <li>• Data Architect</li> <li>• Data Librarian</li> <li>• Data Manager</li> <li>• Data-Mining Specialist</li> <li>• Data Modeler</li> <li>• Data-Processing Manager</li> <li>• Data Quality Engineer</li> <li>• <b>Data Scientist</b></li> <li>• Data Visualization Developer</li> <li>• Database Administrator</li> <li>• Database Analyst</li> <li>• Database Developer</li> <li>• <b>Derivatives Analyst</b></li> <li>• E-Commerce Analyst</li> <li>• Geographic Information System (GIS) Specialist</li> <li>• Health Data Analyst</li> <li>• Information Assurance Analyst</li> <li>• Marketing Research Analyst</li> <li>• Quality Assurance/Business Analyst</li> </ul>
Information Technology (IT)	<ul style="list-style-type: none"> <li>• Computer Support Specialist</li> <li>• Desktop Support Analyst</li> <li>• DevOps (development operations) Analyst +</li> <li>• DevOps Engineer</li> <li>• Hardware Specialist</li> <li>• Helpdesk Consultant</li> <li>• Instructor/Trainer</li> </ul>

	<ul style="list-style-type: none"> <li>• IT Analyst</li> <li>• IT Associate</li> <li>• IT Consultant</li> <li>• IT Project Manager</li> <li>• Local Area Network Manager</li> <li>• Network Specialist</li> <li>• System Developer</li> <li>• Systems Analyst</li> <li>• Systems Architect</li> <li>• Technical Support Specialist</li> <li>• <b>Technical Writer</b></li> <li>• <b>Web Designer/Web Developer</b></li> </ul>
Librarianship/Content Development, Organization, and Preservation	<ul style="list-style-type: none"> <li>• Abstractor</li> <li>• Academic Librarian</li> <li>• Archivist</li> <li>• Bibliographer</li> <li>• Cataloger</li> <li>• Children's Librarian</li> <li>• Content Editor</li> <li>• Content Management Specialist</li> <li>• Data Steward</li> <li>• Digital Archivist</li> <li>• <b>Digital Curation Specialist</b></li> <li>• Digital Librarian</li> <li>• Digital Projects Researcher</li> <li>• Digital Resources Cataloger</li> <li>• Document Analyst/Specialist/Manager</li> <li>• Documentalist</li> <li>• Government Documents Librarian</li> <li>• Health Information Manager</li> <li>• Health Sciences Librarian</li> <li>• Indexer</li> <li>• Information Broker</li> <li>• Information Manager</li> <li>• Information Resources Manager</li> <li>• Law Librarian</li> <li>• Legal Information Specialist</li> <li>• Manuscript Curator</li> <li>• Medical Librarian</li> <li>• Metadata Specialist</li> <li>• Museum Curator</li> <li>• Museum Librarian</li> <li>• Ontologist</li> <li>• Preservationist</li> <li>• Public Librarian</li> <li>• Public Records Researcher</li> <li>• Records Analyst</li> </ul>

	<ul style="list-style-type: none"> <li>• Records Manager</li> <li>• Reference Librarian</li> <li>• School Librarian</li> <li>• School Library Media Specialist</li> <li>• Taxonomist</li> <li>• Technical Services Librarian</li> <li>• Thesaurus Developer</li> <li>• Visual Resources Specialist</li> <li>• Web Architect</li> <li>• Web Content Manager</li> <li>• Webmaster</li> <li>• <b>Young Adult Librarian</b></li> </ul>
Social Media	<ul style="list-style-type: none"> <li>• Online Community Manager</li> <li>• Public Information Officer</li> <li>• Social Media Community Manager</li> <li>• Social Media Manager</li> <li>• <b>Social Media Strategist</b></li> <li>• Social Network Analyst</li> </ul>
Software Development	<ul style="list-style-type: none"> <li>• Application Developer</li> <li>• Game Designer</li> <li>• Product Manager</li> <li>• Software Architect</li> <li>• <b>Software Design Analyst</b></li> <li>• Software Developer</li> <li>• Software Engineer</li> </ul>
User Experience (UX)	<ul style="list-style-type: none"> <li>• Information Architect</li> <li>• Information Designer</li> <li>• Information Experience Designer</li> <li>• Market Researcher</li> <li>• Requirements Analyst</li> <li>• Usability Specialist</li> <li>• User Experience Analyst</li> <li>• User Experience Designer</li> <li>• <b>User Experience Specialist</b></li> <li>• User Interface Designer</li> <li>• User Studies Specialist</li> <li>• UX Researcher</li> </ul>

Some popular online resources that you might like to use to further explore these (and other) career opportunities and to look for relevant job openings include:

- CareerBuilder (<https://www.careerbuilder.com>)
- Dice (<https://www.dice.com>)
- Glassdoor (<https://www.glassdoor.com/index.htm>)
- Indeed (<https://www.indeed.com>)
- LinkedIn (<https://www.linkedin.com/jobs>)
- Monster (<https://www.monster.com>)
- USAJOBS (for positions with the US government) (<https://www.usajobs.gov>)

In searching these websites, you may want to use either the career areas and/or the sample job titles listed in [Table 17.1](#) to help you narrow the results.

In the remainder of this chapter, we'll explore ten of the careers listed in [Table 17.1](#): (1) cyber defense technologist, (2) data scientist, (3) derivatives analyst, (4) technical writer, (5) Web designer/Web developer, (6) digital curation specialist, (7) young adult librarian, (8) social media strategist, (9) software design analyst, and (10) user experience (UX) specialist. Within each of the following sections, we first provide a general introduction to the specified career and then shift our focus to identify the threads of information behavior that pervade the roles and responsibilities that are typically associated with these positions. To conclude the chapter, we underscore the importance of information behavior to the many different types of careers that information professionals (such as you!) undertake, circling back to our opening vignette about novice software developer/game designer Lilia Moussa.

## CYBER DEFENSE TECHNOLOGIST

Cyber defense technologists focus on identifying and addressing any privacy and security risks that may threaten an agency's or company's information systems. They may also design and build security solutions for their employer's systems and/or projects. The position of Cyber Defense Technologist I tends to be an entry-level position, well suited for new and recent graduates of information science programs. When hiring for this position, employers often look

for candidates who hold a bachelor's degree in information science, information systems, information technology, cybersecurity, or some related degree. Additionally, they tend to emphasize that candidates must possess an in-depth understanding of computer hardware and operating systems, as well as an awareness of potential vulnerabilities and security solutions. A sample job ad for this position can be viewed at <https://web.archive.org/save/https://jobs.rtx.com/job/marlborough/cyber-defense-technologist-i/30384/16277445>. (Please note that the URLs throughout this chapter have been created using the Internet Archive's [<https://archive.org>] "save page" function in order to ensure that they persist through time. You may need to copy/paste them into your browser [rather than clicking on them] and they may take a couple of minutes to fully load.)

An understanding of information behavior is of central concern to this position in several different respects. Knowing how and why people engage with information systems can enable the person in this position to be better prepared to identify potential privacy and security risks posed by existing systems. For example, one of the fundamental, often-reached findings in information behavior research is that people highly value convenience. Thus, a system that facilitates, in any way, an unauthorized user's access to protected data will invite this type of behavior; conversely, a system that thwarts unauthorized users' access to protected data will help to mitigate this behavior. An understanding of information behavior will similarly benefit cyber defense technologists as they work to design and develop new security solutions for their employers' projects and systems. Again taking the example of convenience, technologists will want to design and build security solutions that facilitate (or at least do not impede) the work of authorized users, while making it difficult for unauthorized users to enter the system and access protected data. If you are an information science student interested in exploring jobs similar to this Cyber Defense Technologist I position, or if you are considering a cybersecurity-related career, you can also explore the interactive Cyberseek Career Pathway tool (<https://web.archive.org/web/20200826223956/https://www.cybersee>

[k.org/pathway.html](#)), which was developed in partnership with the National Initiative for Cybersecurity Education (NICE), a branch within the US National Institute of Standards and Technology (NIST). This interactive tool allows users to see the career progression and information-science-related skills needed to build a successful cybersecurity career.

## DATA SCIENTIST

Data scientists are experts at gathering, organizing, analyzing, interpreting, and mining data for important insights, often in support of optimizing decision making. There are many different types of data scientists, and they engage in a variety of roles. A wide range of employers hire data scientists, including banks, marketing and advertising agencies, tech companies, and universities. Generally, employers looking for entry-level data scientists are seeking people who hold a bachelor's in math, statistics, engineering, or computer or information science. They often want someone who is well versed in statistics, able to hypothesize about and spot emerging trends, proficient in at least one programming language (typically Python or R), and experienced in machine learning (which involves enabling systems to consume and learn from data, optimizing themselves in the process). More specifically, employers tend to look for candidates who are experienced with programming languages (particularly Python, R, SQL, and VBA [Visual Basic for Applications]); who are well versed in data visualization tools, such as Tableau and Qlik; who have in-depth knowledge and experience with data analytics; and/or who have experience in UX design. A sample job ad for a junior data scientist apprenticeship with IBM can be viewed

at

[One of the central roles of many data scientist positions is to hypothesize, identify, and visualize trends in \(often quite large\) data sets. Depending on the nature and context of the particular job, data scientists may be called upon to identify and visualize trends in](https://web.archive.org/web/20200829205300/https://careers.ibm.com>ShowJob/Id/966867/Junior-Data-Scientist-Apprenticeship/</a>.</p></div><div data-bbox=)

people's information behaviors. For example, a search engine optimization company may hire data scientists to help them analyze a large data set containing specific types of information, such as the queries people submit to a particular search engine when looking for a particular type of product.

## **DERIVATIVES ANALYST**

Derivatives analysts use mathematical formulas and build descriptive and predictive statistical models and computer algorithms to detect trends in financial data and identify investment opportunities. Derivatives are contracts whose values are determined by some type of underlying asset, such as stocks, bonds, or commodities like gold, oil, or gasoline. Derivatives analysts frequently work closely with portfolio managers, risk managers, brokers, traders, and technology teams. The responsibilities of derivatives analysts vary a great deal, depending on the nature of the specific position. Common responsibilities include:

- cleaning, validating, and analyzing large data sets;
- ensuring that employees adhere to legal requirements and to any procedures that have been set up to control the risk that their firm and/or their clients are exposed to in conducting transactions;
- preparing reports for management; and
- identifying and improving any inefficiencies in the firm's workflows.

Employers looking to hire entry-level derivatives analysts often require applicants to have earned a bachelor's degree (particularly in accounting, finance, mathematics, business, or information technology), as well as experience with specific computer programs and languages, such as Excel (particularly desirable is an in-depth knowledge of macros), SQL, VBA, and Python. A sample job ad for an OTC (over-the-counter) derivatives analyst position can be viewed at

<https://web.archive.org/web/20200610171328/https://www.linkedin.com/jobs/view/1722004639>.

Knowledge of the information behaviors of co-workers, managers, and investors will enhance the work of a derivatives analyst. For example, preparing a useful report for management will require knowledge of the manager's information needs and information-related preferences. Similarly, ensuring that employees are adhering to risk control procedures necessitates an in-depth knowledge of their information-related practices, including the ways in which they seek, present, and act on information. Derivatives analysts can also enhance their statistical models and computer algorithms by factoring in important variables relating to stakeholders' information needs and information behaviors, such as investors' past information behaviors and managers' specific information needs.

## TECHNICAL WRITER

Technical writers communicate complex information in a clear and simplified manner, often producing and/or editing a wide range of end products, such as an online help feature for some system or piece of software, a print instruction manual, an online user guide, or a grant proposal. The main challenge faced by many technical writers is to present complicated information in a way that is easy for even a novice user/reader to understand and follow. Technical writers may use various techniques to try to simplify complicated material, such as creating pictures and diagrams and varying font styles, sizes, and colors. It is very important for technical writers to understand not only the product (or other type of entity) they're writing about but also the audience(s) for whom they're writing. They need to know a great deal about their target audience, including their needs, goals, prior relevant experiences, and their preexisting knowledge. Technical writers draw on this information to ensure that their instructions (or other types of creations) are tailored to – and thus are usable and useful for – their particular target audience(s).

Employers looking to hire an entry-level technical writer usually require at least a bachelor's degree (particularly in English,

journalism, communications, computer science, or information science), as well as some experience with writing, proofreading, and editing technical documentation. An example of a job ad for a technical/proposal writer can be viewed at <https://web.archive.org/web/20200610193112/https://portal.issi-software.com/careers/view/2>.

An in-depth understanding of the target audience(s), including their needs, their motivations, their preferences, their goals, their relevant prior experiences, and their preexisting knowledge (both domain-related and system-related) is crucial to the development of technical documentation that will be understandable to and usable by these specific individuals. Knowledge about their information needs, information-related preferences, and information-seeking habits will be a central component of this understanding. User manuals and other forms of technical documentation should not be developed before a technical writer gets to know their audience. Failure to take this crucial step creates a serious risk of the technical writer unconsciously aiming the manual toward themselves and tailoring it to their own personal experiences and preexisting knowledge, rather than aiming it toward the actual users who will need to use it and tailoring it toward their personal experiences and preexisting knowledge (which is very likely to differ a great deal from those of the technical writer!).

## **WEB DESIGNER/WEB DEVELOPER**

Although Web designers use graphic design software, such as Adobe Photoshop and Illustrator, to design websites that are user friendly and appealing to users, Web developers use programming languages such as HTML, JavaScript, and Python to build functional websites. Web designers and developers are hired by a very wide range of employers, including schools, companies, and government agencies. In fact, it is difficult to think of a potential employer that does not have some type of Web presence and, thus, a need for at least one Web designer/developer. Depending on the size of the organization, one individual could serve in both of these roles.

Employers looking to hire Web designers and developers typically require a bachelor's degree in an area such as computer science, human-computer interaction, information technology, information science, information management, or design. Job ads for these positions typically list the specific software packages and/or programming languages they require applicants to know. An example of a job ad for a Web designer can be viewed at [https://web.archive.org/save/http://www.latitudeinc.net/staffing-solutions/job/job\\_20170718191157\\_HMEOAO5DJYJMDEAZ.html?q=web%2520designer](https://web.archive.org/save/http://www.latitudeinc.net/staffing-solutions/job/job_20170718191157_HMEOAO5DJYJMDEAZ.html?q=web%2520designer). An example of a job ad for a Web developer can be viewed at <https://web.archive.org/web/20200610201704/https://ejobs.umd.edu/postings/70149>.

Web designers and Web developers have a profound influence on the accessibility, usability, usefulness, and aesthetic appeal of websites for their target audiences. The ways in which websites are designed and built shape not only people's information behaviors as they use the website but also users' likelihood of success in effectively and efficiently achieving the goal(s) that brought them to the website. Websites that support people's actual information behaviors and that facilitate people in reaching their goals will be far more likely to satisfy their users and to attract repeat visitors. On the other hand, websites that do not support, or even worse, actually hinder, users as they look for information on the site are likely to lose repeat visitors. Equally important, such websites may also lose potential customers, creating missed opportunities for schools, government agencies, nonprofit organizations, and other entities to assist users with their information (and other types of) needs.

## DIGITAL CURATION SPECIALIST

Digital curation specialists organize, manage, preserve, provide, and facilitate access to digital assets (i.e., any type of content that is stored digitally, such as Microsoft Word files, photos, videos, audio files, and PowerPoint files). Digital curation is a relatively new and growing field, necessitated by the growing proportion of information

that is available (sometimes only) in digital format and by changes in technology over time that may pose a barrier to future access to digital materials. For example, will you be able to open a Microsoft Word file in twenty years? Digital curation specialists work in a variety of different organizations, including libraries, archives, museums, government agencies, nonprofit organizations, and businesses such as health care and technology companies.

The job responsibilities for these positions vary widely, but commonly include:

- selecting (choosing which items to keep and to perhaps digitize, if necessary), archiving (storing), and preserving (ensuring the accessibility and usability of a digital item into the future) both digitized materials (materials that were originally produced in paper format, but that have since been converted to a digital format) and born-digital materials (materials that were created digitally and that have never been available in a paper format);
- creating metadata (basically tags that enable users to use keywords to retrieve what they're looking for) that enables people to effectively and efficiently gain access to the digital materials they're seeking;
- developing and documenting policies and procedures to be adhered to in the management of these materials;
- publicizing and promoting the materials (which are often housed in a repository, many of which offer related programs and services);
- training users on how to find and use materials in the repository and perhaps how to contribute additional materials to the repository as well; and
- keeping up to date on any emerging trends within the profession, such as any new technologies, processes, and types of equipment.

Employers looking for digital curation specialists often require a Master in Library Science (MLS) degree or a Master in Library & Information Science (MLIS) degree. A sample job ad for a digital

curation specialist can be viewed at <https://web.archive.org/save/http://www.careerweb.co.za/Common/ViewJob.asp?JobID=262701>.

The ability of digital curation specialists to successfully perform their job duties fundamentally rests on a knowledge of their actual and potential users' information needs and information-seeking strategies. Choosing which materials to select and preserve, facilitating users' access to these materials, and training them on how to retrieve, make use of, and contribute their own materials all would be very difficult to do successfully without this foundational knowledge. Digital curation specialists need to know the motivations and goals of their actual and potential users so that they can select, organize, and preserve materials that will best meet their needs.

## **YOUNG ADULT LIBRARIAN**

Young adult librarians work in public or school libraries, focusing on the needs and interests of teens (generally young adults ages twelve through eighteen). They perform a wide range of duties, including:

- selecting and purchasing materials (including books, audiobooks, and games) for their library that take into account the cultural diversity and interests of teens in their communities/schools;
- recommending books and eBooks to teens based upon their individual interests (this process is sometimes referred to as "reader's advisory services");
- answering reference questions posed by young adults;
- helping teen visitors to use the library's computers and other types of technologies;
- providing homework help; and
- designing, developing, and running services and programs specifically tailored to young adults.

Some examples of programs commonly offered by young adult librarians include book talks and discussion groups, summer reading programs, health literacy workshops, job search workshops, gaming

tournaments, scavenger hunts, music-making programs, photo contests, film screenings, and trivia contests. In recent years, some libraries have added a makerspace, which is a portion of the library that contains specialized tools (such as a 3D printer) and supplies to enable patrons to create items such as recent efforts to create masks for health-care workers to protect them from COVID-19. Through workshops and other hands-on programming, teenagers have the opportunity to gain valuable experience with makerspace tools and technology.

Young adult librarians fulfill a set of very important roles, including ensuring that young people's information needs are met with trustworthy information; providing and maintaining a safe and welcoming space in which teens can learn and enjoy themselves; enabling them to learn about and use materials that they may not have access to from home (e.g., books, computers, movies, musical instruments, and 3D printers); helping them to develop important life skills; providing them with opportunities to socialize with their peers and adults; and, ideally, inspiring an interest in, and a commitment to, lifelong learning.

Public and school libraries seeking to hire a young adult librarian often require a master's degree in library science (MLS) or a master's degree in library and information science (MLIS). If you are currently attending an iSchool, it is highly likely that your school offers an MLS or MLIS degree program, which you can pursue once you have earned your bachelor's degree. The American Library Association (ALA), which was formed in 1876 to provide leadership for the development and improvement of libraries and the librarianship profession, accredits MLS and MLIS programs in the United States, Canada, and Puerto Rico. A searchable database, as well as a list in PDF format, of all currently accredited programs can be accessed at [www.ala.org/educationcareers/accreditedprograms/directory](http://www.ala.org/educationcareers/accreditedprograms/directory).

In addition to an MLS (or MLIS) degree, employers looking to hire a young adult librarian often look for candidates who are energetic; knowledgeable about library technologies and offerings for young adults; aware of teens' interests and needs and the challenges they face; familiar with young adult literature; and passionate about

advocating for, engaging, serving, and supporting teens in their local communities. A sample job ad for a young adult librarian can be viewed at

<https://web.archive.org/web/20200610202023/https://careers-bklynlibrary.icims.com/jobs/1977/young-adult-librarian/job?mobile=false&width=1140&height=500&bga=true&needsRedirect=false&jan1offset=-300&jun1offset=-240>.

To best serve and advocate for their users, young adult librarians need to be very familiar with the teens in their communities/schools, developing and keeping up to date an in-depth knowledge of their information needs, their information-related preferences, their interests, and their information-seeking habits. This knowledge will be foundational to everything the young adult librarian does, necessarily informing nearly all of their decisions, including which books to purchase, what format to buy them in, and how to arrange them in the library; which book(s) to recommend to a particular teen; how to best address the reference questions posed by teens, but even more importantly, their actual information needs; what types of equipment, tools, and materials to offer in the library, how to make these visible and accessible to teens, and how to best train them on the use of these items; and which types of programs and workshops are likely to be of interest to and useful for the teens in their communities/schools.

## **SOCIAL MEDIA STRATEGIST**

Social media strategists design and implement strategies to reach target customers or other types of audiences through social media channels, including Facebook, Twitter, Instagram, Tumblr, LinkedIn, Snapchat, YouTube, and Pinterest. Social media strategists are employed within a number of different types of organizations. For example, a company may hire a social media strategist to figure out how to use various social media channels to reach out to and communicate with intended customers. Similarly, libraries (such as the National Library of Medicine) may hire a social media strategist to help increase the public's awareness of the resources, programs, and

services that the library makes available to them. Colleges and universities often hire social media strategists to reach out to potential students, aiming to increase their interest in the school and answer any questions they may have. Nonprofits may also hire social media strategists, counting on them to figure out the best ways to use social media channels to reach out to potential donors and/or make the public available of the services that they offer. In order to optimize their ability to do their jobs in the ever-changing social media environment, social media strategists frequently research evolving social media trends and hashtags. They also use analytics to assess the effectiveness of their efforts and to adjust their strategies as needed.

Employers looking to hire a social media strategist often look for someone with a bachelor's degree (particularly in English, journalism, marketing, communications, computer science, information science, or business); with extensive knowledge about marketing and social media channels and audiences; and experience using relevant technologies, such as Adobe Illustrator and Photoshop. A sample job ad for a social media strategist can be viewed at <https://web.archive.org/save/https://recruiting.ulipro.com/NAT1020NAQUA/JobBoard/807a3c85-8038-7ec5-5c50-4abbd08029e/OpportunityDetail?opportunityId=832bc107-ad05-47da-8452-a239c3846d98>.

In order to develop the most effective strategies for reaching particular group(s) of people, social media strategists need to develop (and continually keep up to date) an awareness of the platforms people are turning to, whether they're looking for information or aiming to share information with others. A familiarity with patterns in the present-day information needs, information-related preferences, and information-seeking strategies of target groups will enable social media strategists to accurately identify the most advantageous strategies and channels for reaching out to and engaging with members of these groups.

## **SOFTWARE DESIGN ANALYST**

Software design analysts often work with co-workers and/or end users to determine their needs and then draw on this information to design new software tailored to these needs. They may also work with stakeholders to identify any problems with existing software and design improvements to address any issues with the features and functionality of the existing software. Additionally, software design analysts may work with stakeholders across time, ensuring that any new software and/or design improvements to existing software are meeting their needs and facilitating their achievement of their goals. Software design analysts frequently work with teams of developers, who are the ones who actually implement their designs, so they tend to serve as bridges between end users and developers, ensuring that developers build a product that actually meets the users' needs.

Employers looking to hire a software design analyst often seek applicants with a bachelor's degree (particularly in computer science or computer engineering) and experience using relevant technologies, such as Oracle PL/SQL and .NET. A sample job ad for a software design analyst can be viewed at <https://web.archive.org/save/https://lensa.com/software-design-analyst-i-jobs-atlanta/jd/f3d4a2c79b8540e7f8a317d702d75d4f>.

A fundamental aspect of the duties of a software design analyst is to work with software users to understand their needs and goals before they jump in to actually doing any of the designing. Software design analysts frequently interview existing or potential users about their information needs, their information-related preferences, their information-seeking habits, and their goals for using the software that the analyst will be designing for them. Software design analysts also may observe actual or potential users making use of the new (or existing) software. Through these observations, they can assess the fit of the software with the users' needs and goals, as well as any specific barriers they may encounter as they make use of the software. Without this knowledge, software design analysts would be unable to tailor and optimize their design of new software (and/or to suggest improvements to existing software) to better meet the needs and goals of existing and/or potential users.

## **USER EXPERIENCE (UX) SPECIALIST**

User experience (UX) specialists conduct user experience research, working directly with users to determine their needs, their goals, and the challenges they face when working to reach these goals. Ultimately, they aim to use this information to inform the design of new products and/or the design of existing products. UX specialists often focus on ensuring the accessibility, usability, and usefulness of products for the target audience, making certain that user-centered design principles are adhered to in the design, development, and deployment of each individual product. UX specialists also commonly continue to engage with users as they interact with a product over time, iteratively assessing the need for and informing improvements to the product so that the product is optimized to enable users to achieve their goals as effectively and efficiently as possible.

Employers looking to hire UX specialists often look for someone who holds a bachelor's degree (particularly in human-computer interaction, human factors, cognitive psychology, computer science, information systems, or graphic design) and who has some experience with user-centered design or UX development or testing. A sample job ad for a user experience specialist can be viewed at <https://web.archive.org/web/20200610210346/https://www.linkedin.com/jobs/view/1889547424>.

Developing an in-depth understanding of target users' information needs and the ways in which they seek, interact, and make use of information will be fundamental to the UX specialist's ability to ensure that the product they've designed (or will be designing) will be a good fit for users. User-centered design is, at its very core, about keeping the target user at the very center in any design-related decisions. The more you know about your user, the better able you will be to design a product (or improve an existing product) that is accessible, usable, and useful – one that optimally supports their ability to reach their goals effectively and efficiently.

## **CONCLUDING THOUGHTS**

In this chapter, we have highlighted the crucially important threads of information behavior that underlie the many different careers that make up the information professions. Hopefully, we've convinced you that information professionals need an in-depth and up-to-date understanding of the information needs, information-related preferences, and information behaviors of their target users, patrons, co-workers, and/or other individuals in order to carry out their job responsibilities in a way that will lead to the maximum benefit for all of these populations. As demonstrated in our opening vignette, an understanding of one's target users is an important complement to the technical skills needed to successfully perform one's job. Lilia could make assumptions about what players are looking for but, in doing so, she could entirely miss the mark in terms of their preferences and needs. Her thesis research gave her a foundation based not on assumptions but on actual data collected directly from a population that was similar to the population for which she is now designing games.

Information professionals who rely solely on the technical skills required to do their job, neglecting to learn about the specific population(s) whom they are trying to serve or engage, are taking a risk. Although they likely can develop something functional, it may be of no interest or use to the very people for whom it was intended. It may come down to the difference between a job done and a job done well – the latter involving a thorough investigation that leads to user needs being satisfied and, ultimately, to your clients and supervisors being pleased with the work that you have done.

## DISCUSSION QUESTIONS

- Of the ten careers discussed more in depth in this chapter, which two do you think are most closely tied with people's information behaviors? Why? Which two do you think are the least closely tied with people's information behaviors? Why?
- Have you ever had difficulty using an instruction manual or an online help file? What kinds of difficulties did you encounter? Do

you think that the writer consulted any actual users before writing their documentation? What gave you this impression? How might they have done a more effective job?

- Thinking about the information science career you're planning to pursue, what connections to information behavior do you see? How might knowledge of your customers' and/or co-workers' information needs and behaviors enable you to do a better job? What impacts might result from taking the time to develop this knowledge, keep it up to date, and take it into account in the performance of your job responsibilities? How might you and/or your customers or co-workers benefit?

**Learning Activity:** Using Google or one of the specific sites mentioned earlier (CareerBuilder (<https://www.careerbuilder.com>), Dice (<https://www.dice.com>), Glassdoor (<https://www.glassdoor.com/index.htm>), Indeed (<https://www.indeed.com>), LinkedIn (<https://www.linkedin.com/jobs>), Monster (<https://www.monster.com>), and USAJOBS (for positions with the US government) (<https://www.usajobs.gov>), search for a job posting that describes your dream job (or something close to it). Read through the position description carefully, particularly paying attention to the requirements and the responsibilities. Do any of the specific requirements and/or responsibilities seem to relate to information behavior? Which ones? How might your knowledge about information behavior help you to outshine other applicants and to do a better job in this position?

Describe a research investigation that you might conduct into the information behaviors of your managers, co-workers, clients, or customers that you believe would help you to optimize your performance in this position. What question(s) would you like to answer? How would you go about answering them? How might you draw on your findings to optimize your job performance? What specific types of impact(s) might your investigations lead to?

## FURTHER READING

Following is a list of resources you might consult for further information about potential careers you might like to pursue. The first two sections list more general resources. The first section includes very general career guides, and the second lists career guides that are still quite broad but that focus more specifically on careers in the information professions. The remaining sections focus on the more specific career areas explored within this chapter: cybersecurity/information security; data analytics/data science; information technology/software development; library and information science; social media; and user experience.

## **General Career Guides**

- Bolles, R. N. (2018). *What Color Is Your Parachute? Job Hunter's Workbook* (5th ed.). New York: Ten Speed Press.
- Bolles, R. N. (2019). *What Color Is Your Parachute? 2020: A Practical Manual for Job-Hunters and Career-Changers*. New York: Ten Speed Press.
- DK. (2019). *Careers: The Ultimate Guide to Planning Your Future* (2nd ed.). New York: DK Publishing.
- Lore, N. (2012). *The Pathfinder: How to Choose or Change Your Career for a Lifetime of Satisfaction and Success*. New York: Touchstone.
- Tieger, P. D., Barron, B., & Tieger, K. (2014). *Do What You Are: Discover the Perfect Career for You through the Secrets of Personality Type* (5th ed.). New York: Little, Brown and Company.

## **Information Professionals (broadly defined) Career Guides**

- De Stricker, U., & Hurst-Wahl, J. (2011). *The Information and Knowledge Professional's Career Handbook: Define and Create Your Success*. Oxford, UK: Chandos Publishing.
- Lawson, J., Kroll, J., & Kowatch, K. (2010). *The New Information Professional: Your Guide to Careers in the Digital Age*. New York: Neal Schuman Publishers.
- Stanton, J. M., Guzman, I. R., & Stam, K. R. (2010). *Information Nation: Education and Careers in the Emerging Information Professions*. Medford, NJ: Information Today, Inc.

## **Cybersecurity/Information Security Careers**

- Elsawah, A. (2019). *Breaking In: A Practical Guide to Starting a Career in Information Security*. Independently published.
- Gregory, P. H. (2015). *Getting an Information Security Job for Dummies*. Hoboken, NJ: John Wiley & Sons, Inc.
- Ozkaya, E. (2019). *Cybersecurity: The Beginner's Guide: A Comprehensive Guide to Getting Started in Cybersecurity*. Birmingham, UK: Packt Publishing Ltd.

## **Data Analytics/Data Science Careers**

- Eremenko, K. (2018). *Confident Data Skills: Master the Fundamentals of Working with Data and Supercharge Your Career*. New York: Kogan Page Limited.
- Rajaram, A. (2019). *Data Science Jobs: Career Guide for Students & Professionals*. JA Publishing.

- Robinson, E., & Nolis, J. (2020). *Build a Career in Data Science*. Shelter Island, NY: Manning Publications Co.
- Williamson, J. (2015). *Getting a Big Data Job for Dummies*. Hoboken, NJ: John Wiley & Sons, Inc.

## Information Technology/Software Development Careers

- Dafforn, E. (2020). *Information Technology (IT) Professionals: A Practical Career Guide*. Lanham, MD: Rowman & Littlefield.
- Hamilton, T. B. (2020). *Computer Game Development and Animation: A Practical Career Guide*. Lanham, MD: Rowman & Littlefield.
- Laakmann McDowell, G. (2014). *Cracking the Tech Career: Insider Advice on Landing a Job at Google, Microsoft, Apple, or Any Top Tech Company*. Hoboken, NJ: John Wiley & Sons, Inc.
- Sonmez, J. (2017). *The Complete Software Developer's Career Guide: How to Learn Programming Languages Quickly, Ace Your Programming Interview, and Land Your Software Developer Dream Job*. Sanford, NC: Simple Programmer.
- Tedrick, S. (2020). *Women of Color in Tech: A Blueprint for Inspiring and Mentoring the Next Generation of Technology Innovators*. Indianapolis, IN: John Wiley & Sons, Inc.
- Wheeler, T. (2016). *Women in Tech: Take Your Career to the Next Level with Practical Advice and Inspiring Stories*. Seattle, WA: Sasquatch Books.

## Library & Information Science (LIS) Careers (including jobs in libraries, archives, and museums)

- Dority, G. K. (2012). *LIS Career Sourcebook: Managing and Maximizing Every Step of Your Career*. Santa Barbara, CA: ABC-CLIO.
- Dority, G. K. (2016). *Rethinking Information Work: A Career Guide for Librarians and Other Information Professionals* (2nd ed.). Santa Barbara, CA: ABC-CLIO.
- Douglas, S. (2016). *Quiet, Please: Dispatches from a Public Librarian* (10th anniversary edition). Saskatchewan, Canada: SD Editions.
- Ennis, L. A., & Mitchell, N. (2010). *The Accidental Health Sciences Librarian*. Medford, NJ: Information Today, Inc.
- Fourie, D. K., & Loe, N. E. (2016). *Libraries in the Information Age: An Introduction and Career Exploration* (3rd ed.). Santa Barbara, CA: ABC-CLIO.
- Foxworth, D. J. (2019). *Landing a Library Job*. Lanham, MD: Rowman & Littlefield.
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# Glossary

**Academic library:** A library that belongs to a particular college or university and that supports the institution's students, staff, and faculty members. Some academic libraries are open to the public as well.

**Access to justice:** The ability of every individual to effectively advocate for their own interests in the legal system. Access to justice has two main components: (1) access to an appropriate level of legal assistance and (2) access to a fair and efficient court or dispute resolution process.

**Accessibility:** The extent to which an information technology is accessible (that is, available and usable) to all users, including those who have one or more disabilities. The key question regarding accessibility is whether every individual can make use of and benefit from a particular information technology.

**Anomalous State of Knowledge (ASK):** Coined by information retrieval researcher and library and information science professor Nicholas Belkin (1980), this phrase is used to describe the situation when a user has a sense that they're missing information but is unable to describe the gap in their knowledge.

**Attention:** A limited resource that people choose to distribute across different sources, topics, or tasks. As our access to information has grown (particularly with the proliferation of the Internet), the bottleneck has become our attention. We may have access to information on some particular topic, but we may be unable or unwilling to devote our attention to it.

**Berrypicking:** Coined by information retrieval and information behavior researcher and information studies professor Marcia Bates (1989), this term refers to the movements that people frequently make when information seeking, moving from "bush" (information source) to "bush" to obtain ("pick") pieces of information ("berries"). People often move to a different bush when they observe that other bushes appear to have more berries (that is, useful pieces of information). Bates pointed out that people's information needs, the search techniques they use, and the sources they consult all tend to shift as they work on resolving their information need.

**Boolean operators:** Boolean operators – the terms AND, OR, and NOT – enable users to narrow or widen their searches. The AND operator enables users to narrow their search, as only search results that mention both (or all) terms will be returned. In contrast, the OR operator will widen a user's search results, as it will retrieve articles that contain one or both (or all) of the user's search terms. The NOT operator enables users to narrow their search results, eliminating any items that contain the word or phrase following "NOT." Most systems require that the user enter Boolean operators using all capital letters.

**Browsing:** Looking through source(s) of information. Browsing can range from completely planned and goal directed to completely unplanned and not driven by any goal in particular.

**Card sorting:** A data collection technique used by HCI researchers and practitioners (among others) to discover patterns in the way that people tend to group and/or name a collection

of items. For example, researchers may conduct a card-sorting study to help inform their design of the architecture of a particular website.

**Citation analysis:** The process of analyzing a body of literature with the goal of identifying patterns in the citations. Such analyses can enable researchers to uncover who has influenced a particular researcher's work and to develop a picture of how a particular field has developed over time.

**Citation managers:** Also known as bibliographic management software, citation managers support the user in keeping track of the articles they have read. Generally, citation managers enable users to create a database containing citation information for each of the articles they've read. Citation information usually includes the author name(s), article title, journal title, journal volume and issue number, and page range. Some examples of commonly used citation managers include Zotero (<https://www.zotero.org>), EndNote (<https://endnote.com>), Mendeley (<https://www.mendeley.com>), and RefWorks (<http://proquest.libguides.com/newrefworks/welcome>).

**Citation style:** Most journals require authors to use a particular type of formatting when citing other people's work within the body of their papers and when preparing their reference lists. A commonly used citation style in library and information science is APA (American Psychological Association) style. For more information on APA style, see the Purdue Online Writing Lab (OWL) APA Formatting and Style Guide ([https://owl.purdue.edu/owl/research\\_and\\_citation/apa\\_style/apa\\_formatting\\_and\\_style\\_guide/general\\_format.html](https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html)).

**Closed-ended questions:** Sometimes referred to as just "closed questions," these types of questions are ones that respondents must answer by selecting an option from a limited set of response options that are provided to them. For example: "Is your favorite color red, blue, or green?" (What if the respondent's favorite color is purple?!)

**Co-design:** The process of involving users as equal partners in the design of an information technology. Co-design is closely related to "participatory design" and "user-centered design"; however, co-design emphasizes giving users as much power and input into the design of information technologies as possible.

**Collaborative information seeking:** Looking for information jointly with other people. For example, you and your friend may go on the Internet together to look at the newest skateboards.

**Confirmation bias:** People tend to look for and be more open to information that agrees with what they already believe.

**Consumer health information behavior:** An umbrella term that encompasses people's health-related information needs as well as the activities in which they engage (or not) in order to look for, manage, share, and make use of this information.

**Content analysis:** The process of analyzing the contents of documents, such as letters, newspapers, books, journal articles, speeches, or songs. Researchers who conduct content analysis may focus solely on the actual words or they may try to also read between the lines to identify latent content. Content analysis can be conducted either quantitatively (e.g., How many times does the word "information" appear in a given document?) or qualitatively (e.g., What are the different types of information that are mentioned throughout the document?).

**Context:** The larger environment in which a user's information need is couched and in which their information behavior unfolds. Context includes factors such as the individual's personal characteristics (e.g., age, educational attainment, their preexisting knowledge on the topic), their role (e.g., student, concerned parent, doctor), their current situation, the task in which they're engaged, and their goals. Contexts are complex, messy, and ever-

evolving. An individual's information behaviors are shaped by their context. And, in turn, their information behaviors help to shape their future context.

**Controlled vocabulary:** The use of a standardized set of subject headings (sometimes referred to as just "subjects" or "descriptors") to represent specific concepts. Library databases that use a controlled vocabulary enable users to maximize the recall and precision of their searches, as indexers have already mapped related terms to the official subject term(s)/phrase(s). There is no need for users to try to come up with all of the synonyms that authors might have used to refer to the same concept.

**Convenience:** People often prefer to use information sources that are easy to access. In fact, it is not uncommon for people to value convenience over the quality of the information.

**Convenience sampling:** The process of recruiting study participants who are members of the population under study and who are easily accessible to the researcher. For example, a researcher studying fibromyalgia patients may simply invite their friends who have fibromyalgia to participate in their study.

**Cooperative inquiry:** A form of co-design that entails working with adults or children as full partners at all stages of the information technology design process.

**Credibility assessment:** The activities that users may (or may not) conduct in order to evaluate whether information is credible. Credibility is a complex, multifaceted construct. Researchers have used multiple concepts to define credibility, including trustworthiness, expertise, believability, fairness, accuracy, freedom from bias, and informativeness.

**Data analysis:** The processes a researcher uses to analyze the data they've collected from their study participants (e.g., qualitative data analysis, statistical analysis, social network analysis). Generally, a researcher's selection of data analysis techniques is driven by the type(s) of data they have collected.

**Data collection:** The processes used to gather data from study participants (e.g., observation, surveys, interviews). Researchers select which data collection technique(s) to use depending on the nature of their research questions.

**Diary:** A data collection method that requires study participants to keep a record of their thoughts, feelings, and actions. Diaries can be completely unstructured (i.e., a blank piece of paper) or they may be structured to some degree through the use of particular questions and, in some cases, response options.

**Digital divide:** The chasm between people who have computer and Internet access and those who do not. A lack of computer and Internet access tends to be most prevalent among people who are already disadvantaged, such as people who are older than sixty-five, people who have lower incomes, people with less education, people who are not native English speakers, people who are disabled, and people who live in rural areas.

**Digital inclusion:** The activities that are required in order to ensure that everyone, particularly those who are disadvantaged, has access to and can use and benefit from ICTs. These activities include providing affordable, reliable broadband Internet service and Internet-enabled devices; access to digital literacy training; high-quality technical support; and applications and online content that enable people to be self-sufficient and to participate and collaborate with others.

**Digital literacy:** The set of skills one needs to have in order to find and consume, create, and communicate or share digital content, whether for school, work, or everyday types of tasks.

**Discipline-based repository:** An online archive where authors working within a particular discipline (e.g., library and information science) can deposit and share their work. Examples of discipline-based repositories in our field are e-LiS (E-Prints in Library & Information Science): <http://eprints.rclis.org/> and DLIST (Digital Library of Information Science and Technology): <https://repository.arizona.edu/handle/10150/105067>.

**Discourse analysis:** The process of analyzing conversations, such as ones in which information is requested and/or provided.

**Disinformation:** Inaccurate information that is developed and communicated with the express intention of deceiving the recipient.

**Empirical research:** Research that involves study participants who belong to the population being studied and that makes use of methods such as interviewing, observation, surveys, and experiments.

**Ethnography:** A type of research study in which the researcher completely immerses themselves in the study population's everyday life context, frequently over an extended period of time. Ethnographies are sometimes referred to as "deep hanging out."

**Everyday life context:** The context of people's nonwork and nonschool activities. For example, people's hobby-related information behaviors pertain to their everyday life context.

**Everyday life information seeking (ELIS):** Seeking information on any topic that is not related to one's schoolwork or job, such as when one looks for information relating to one's hobbies. The terms "everyday information needs" and "everyday information behavior" are closely related to ELIS.

**Experience sampling method (ESM):** A data collection method sometimes used in diary studies that entails contacting one's study participants at various times throughout the day (or week) to request that they make an entry in their diary. The goal of using ESM is to overcome potential problems with artificiality and participant memory limitations.

**Experiments:** A type of research study that enables researchers to test their hypotheses. There are two main types of experiments – lab experiments and field experiments. The former involves bringing study participants into a lab so the researcher can have more control over the environment. The latter entails conducting an experiment in a real-world setting.

**Fake news:** False news that is deliberately spread through the news media, online social media, or other venues with the explicit intention of misleading people. Such misinformation is often referred to as "disinformation," as it was explicitly communicated with the intention of deceiving the reader.

**Field searching:** Searching within a particular field, such as the author, abstract, or subject headings fields, within a library database.

**First-click testing:** A method that enables UX and usability researchers to determine whether a user starts down the optimal path, given their current task/goal.

**Five filters of question negotiation:** Robert S. Taylor (1968), an academic librarian and information science professor, identified five "filters" through which an inquirer's question passes as a librarian or information specialist works with them to identify and fulfill their information need: (1) the topic of the inquiry; (2) the inquirer's motivation and goals for seeking information; (3) personal characteristics of the inquirer, such as their background, prior knowledge on the topic, and their experiences using the library; (4) how the inquirer's description of their need relates to the resources that are available; and (5) the types of answers that an inquirer is anticipating and would find acceptable.

**Focus group:** A group interview, usually conducted with six to ten participants. Focus groups are usually run by a moderator who keeps the conversation going and on topic, and who makes sure that everyone has the opportunity to participate.

**Four levels of information need:** Robert S. Taylor (1968), an academic librarian and information science professor, identified four stages that library patrons tended to go through with regard to their need for information. At the first level, people had a "visceral need," meaning they just had a vague sense that they were missing some information they needed. At the next level, "conscious need," people were better able to describe the

information they needed, but their description was ambiguous and rambling. At the third level – “formalized need” – people’s descriptions of their information need were much clearer and the librarian was better able to assist them. At the last level – “compromised need” – people attempted to describe their information need in a way that they felt that the librarian would be better able to help them. This last type of need is referred to as “compromised,” as the patron’s efforts to couch their need in a particular way often results in their true need being “compromised” (that is, unclear). Thus, librarians often have to work with patrons to move backward from their compromised need to be able to get at their true information need.

**Gatekeeper:** An individual who has access to a particular population. Researchers may use gatekeepers to assist in their recruitment. For example, if a researcher is studying anti-vaxxers, they may contact an anti-vaxxer who runs a popular online forum to ask if they could post a link to their survey on the forum.

**Genreification:** The process of grouping materials together based on their genre (for example, grouping science fiction books together, art books together, history books together, etc.), rather than using a classification system like the Dewey Decimal system.

**Google bombing:** The purposeful manipulation of Google’s PageRank algorithm to force particular website(s) to the top of a user’s search results when they enter some particular query. For example, a 1999 Google bombing campaign resulted in Google returning Microsoft’s home page as the top result when a user entered the query “more evil than Satan.”

**HackHealth:** An afterschool program funded by the National Library of Medicine (NLM) and developed and implemented by researchers at the University of Maryland College of Information Studies in collaboration with local school librarians. In this program, researchers and librarians worked with middle-school students to improve their digital health literacy skills. The goals of the program were to increase the interest of youth in the sciences (and health, in particular), their confidence in their ability to maintain and/or improve their health, and their understanding of the connections between their health and their everyday health behaviors (such as diet, sleep, and exercise).

**Health disparities:** The tendency for some populations, such as people who belong to racial/ethnic minority groups, who are poorer, and who are less well educated, to suffer poorer health outcomes than others, despite the fact that these differences are preventable.

**Health justice:** The recognition and fulfillment of every individual’s moral entitlement to a sufficient and equitable capability to be healthy. That is, the commitment to ensuring that every individual has access to the resources and opportunities they need in order to optimize their ability to live a long and healthy life.

**Health literacy:** The set of skills one needs in order to be able to find, understand, and make use of health-related information to make appropriate decisions relating to their health. Health literacy encompasses many different types of literacies, including basic literacy (the ability to read and write), visual literacy (the ability to understand information that is portrayed through pictures/visualizations), numeracy (the ability to understand and work with numbers), and media literacy (the ability to access, evaluate, use, and create information using various types of media). Individuals’ health literacy levels have been found to correlate with their health outcomes. People with low levels of health literacy are more likely to report that they’re in poor health, to be hospitalized, and to have poor disease outcomes. Health literacy plays a central role in the creation and maintenance of health disparities.

**Heuristics:** Rules of thumb (e.g., when I see a search result that mentions the Boston Red Sox I always click on it to see what’s going on with my favorite baseball team).

**Heuristic evaluation:** A process used by human factors experts (scientists who study how people interact with and use a product, such as an information system) to assess an interface against an existing set of heuristics, such as Nielsen's (1994) 10 Usability Heuristics (e.g., to what extent can users of a particular information system rely on recognition rather than recall to reduce the burden on their memory?).

**Human–Computer Interaction (HCI):** A multidisciplinary field that focuses on users and their interactions with information technologies, such as computers.

**Hypothesis:** A supposition that a researcher is aiming to test – for example, "People who have broadband Internet access in their homes are more likely to engage in health information seeking."

**Impact factor:** A measure of how many times, on average, an article in a particular journal gets cited by other researchers over a specified period of time (frequently over the past year or over the past five years). Journals with high impact factors are frequently viewed as more reputable, as the work in these journals has been cited more frequently. However, there are some very high-quality open-access journals (freely available to everyone) that do not have impact factors. As a result, any attempt to identify the most reputable journals in a field that relies solely on impact factors will likely miss such journals.

**Incognizance:** Having some particular information need, but being unaware that one has this need. A person who is incognizant does not (yet) even have a visceral sense that they're missing some important piece of information. People who are experiencing incognizance are unlikely to seek information on the topic about which they're incognizant; furthermore, they're likely to be unable to recognize the potential relevance and usefulness of any information that they may happen to come across that actually could help to fulfill that particular information need. Incognizance is frequently only identifiable in hindsight or when one communicates with other people who are (or have been) in a similar situation.

**Infodemic:** The urgent problem we are currently facing in which there is a glut of COVID-19-related information available, but much of it is false. As a result, people are finding it difficult to obtain trustworthy and reliable information. The World Health Organization has used the term "infodemic" to refer to this problem. It has been suggested that the infodemic is such a serious problem that it may even be more dangerous than the pandemic itself.

**Information:** Anything that is perceived to be informative by an individual at some point in time. Information may be objective or subjective, tangible or intangible, internally or externally generated, and true or false.

**Information access:** The degree to which someone has both physical access (e.g., can I get my hands on the information?) and intellectual access (e.g., can I understand the information?) to information.

**Information assessment:** The processes people may (or may not) engage in as they attempt to evaluate the relevance, pertinence, credibility, and usefulness of information.

**Information avoidance:** Commonly, people may passively or actively strive to avoid seeing information on a particular topic. Information avoidance can have some important benefits, such as enabling an individual to maintain or increase their uncertainty, maintain their sense of hope, and control feelings of anxiety. However, information avoidance can have some serious negative consequences, as well, such as reduced quality of life and premature death.

**Information behavior:** An umbrella term used to describe people's interactions (e.g., seeking information) and noninteractions (e.g., ignoring or discarding information) with information.

**Information behavior model:** A description (often shown in a diagram) of the stages through which people advance as they gather (or avoid), manage, share, and use (or not)

information in order to perform some type of task or activity.

**Information behavior research:** Investigations into an individual's or group's information needs and/or their interactions (and noninteractions) with information. Information behavior research encompasses any studies that have focused on people and the ways in which they [insert verb here] information.

**Information behavior theory:** A set of informed beliefs that attempts to explain people's information behaviors.

**Information channels:** The media through which people obtain information, such as television, radio, Internet, etc.

**Information diet:** An important concept in information retrieval researchers Peter Pirolli and Stuart Card's (1999) information foraging theory, an information diet consists of the array of information sources that one chooses to keep conveniently available around them. An optimal information forager will form their information diet so that it consists of the information sources that are most likely to provide them with the most value per unit cost (such as the effort one has to expend to access, understand, and/or use the information).

**Information encountering:** Coming across useful information by chance when not actively engaged in seeking information on that particular topic. Information encountering is sometimes referred to as "serendipity." Information encountering is actually quite common and can occur when engaged in various types of activities, such as talking to a friend or browsing the bookshelves at your local library.

**Information foraging:** Coined by information retrieval researchers Peter Pirolli and Stuart Card (1999), information foraging describes how people adapt their information-seeking strategies and their information environments in order to maximize the amount of useful information they can gain per unit cost (such as effort expended). Information foraging theory posits that people will use the information-seeking techniques that will lead them to the most useful information for the least amount of effort, and they will adapt their environment (such as their office or computer) to support this goal.

**Information ground:** An environment that is temporarily created by people as they come together to perform some task (not explicitly related to information seeking and/or sharing) and find that they begin to spontaneously and serendipitously share information with one another. Information behavior researcher and iSchool professor Karen Fisher (Pettigrew) (1999) coined this term based on the four types of contextual factors that she discovered play a role in shaping the information behaviors of nurses and patients at a foot clinic: (1) the physical characteristics of the clinic environment; (2) the activities taking place in the clinic; (3) characteristics of the nurse's situation; and (4) characteristics of the patient's situation. One example of an information ground is a hair salon.

**Information literacy:** An umbrella term used to refer to the entire constellation of skills people need in order to be able to recognize their needs for information; to find, assess, adapt, and use information that fits with their needs; and to create and share information in a responsible way. The degree to which an individual is information literate (or not) fundamentally shapes their information behaviors, and thus, the ultimate outcomes that can and do result.

**Information literacy instruction:** The process of helping people to acquire information literacy skills, such as the abilities to search for information and assess its credibility. With regard to the latter, many librarians involved in information literacy instruction have been increasingly turning their attention to combating the spread of misinformation and disinformation (sometimes referred to as "fake news"), particularly online via social media.

**Information need:** A conscious or unconscious, recognized or unrecognized, well-defined or ill-defined or completely undefined, articulable or inarticulable lack of knowledge on some

topic. Information needs are sometimes referred to as “gaps” in one’s knowledge. They tend to evolve across time and they may or may not drive information seeking.

**Information needs assessment:** The process of interacting with individuals or a group of people in order to understand their information needs. It is important to conduct an information needs assessment before trying to help people with their information needs, as their questions and descriptions of their information needs are often not a good representation of their actual information needs. After all, it is often very difficult to describe what it is that you don’t know but need to know!

**Information nonuse:** Having information, but not making use of it.

**Information overload:** Having access to such large amounts of information that we feel overwhelmed and unable to make good use of it. People may try to deal with information overload by engaging in potentially problematic information behaviors, such as not processing information at all, processing it incorrectly, saving it to process at some later time, or just ceasing to pay attention to it.

**Information poverty:** When an individual or community systematically lacks physical and/or cognitive access to information. Information poverty is frequently an iteratively reinforcing cycle that is very difficult for people to escape.

**Information provision:** The act of supplying information to another individual or group of people. Ideally, information provision should be informed by an information needs assessment of the individual or group you are striving to help.

**Information retrieval:** The process of submitting a query to an information system (such as Google or a library database) in order to obtain specific information.

**Information scent:** An important concept in information retrieval researchers Pirolli and Card’s (1999) information foraging theory, information scent refers to the cues around information that provide you with hints about its likely value and cost. A Google snippet is an example of the use of information scent. Users can use the information in these snippets in deciding whether or not to click on the various search results.

**Information searching:** This phrase has been used to mean two different things: (1) using the Internet to find information and (2) looking through a particular source in order to find the specific information one needs.

**Information seeking:** A range of activities in which people may engage when they’re looking for information. Information seeking can be active (e.g., going on the Internet and looking for information about cats) or passive (e.g., learning about cats incidentally, as one watches a TV program about cats).

**Information sharing:** Giving information to people or exchanging information with them.

**Information sources:** The various places that people might turn to when they need information, such as the Internet, books, family members and friends, their television, and their doctor. Sources may be informal (e.g., friends) or formal (e.g., doctors). The wide array of types of sources available on the Internet can fall anywhere on the informal–formal spectrum.

**Information use:** A relatively understudied area of information behavior that focuses on the actions people undertake (or do not undertake) once they have found information. These actions may range from assessing the relevance of information to increasing one’s knowledge based on the information one has found to applying the information in some capacity, such as to make a decision, solve a problem, or reach some goal.

**Institutional repository:** An online archive where authors belonging to a particular institution (e.g., University of Maryland) can deposit and share their work. University of Maryland’s institutional repository, DRUM (Digital Repository at the University of Maryland) can be viewed at <https://drum.lib.umd.edu>.

**Institutional Review Board (IRB):** A board that oversees all of the research being carried out by members of the institution. Most colleges and universities have an IRB that reviews and monitors the research being carried out by faculty and students. Researchers must secure IRB approval before beginning their studies. The overarching goal of the IRB is to ensure the protection of the rights and welfare of all research participants.

**Interviews:** A data collection method that entails asking questions of study participants. Interviews can range from unstructured (no predetermined set of questions) to structured (follows a predetermined script and asks a fixed set of questions). Within information behavior research, interviews are commonly conducted in a semistructured manner. The researcher starts out with a fixed set of questions but is free to go off script as needed.

**KidsTeam:** Both a team of collaborators and an after-school participatory design and design-thinking program. KidsTeam is an intergenerational design team comprised of adults and children (typically seven to twelve years old) who work together to co-design technologies that support children's learning and play. The program was founded in 1998 by Professor Allison Druin at the University of Maryland and has proliferated to Boise State University, the University of Washington, and the University of Baltimore. Industry adaptations of KidsTeam have also been developed at Pearson Learning and Google.

**Legal information:** Both primary sources of law (e.g., federal, state, and municipal laws; statutory and case law; regulations, rules, and orders) and resources that have been created to help people learn about, better understand, and/or use the law, such as scholarly articles on specific legal issues published in law reviews (primarily intended for lawyers and law students who have a baseline knowledge of the law) and online tutorials designed to help members of the public feel more comfortable when they have to appear before a judge.

**Legal information literacy:** The extent to which an individual can understand legal information, whether we're talking about a law enacted by the legislature, an article written by a renowned legal scholar, or a pamphlet prepared by a nonprofit organization. Many laypeople (that is, people who do not have legal training) have limited legal information literacy.

**Legal information websites:** Websites that provide legal information to self-help users.

**Legal self-help centers:** Staffed centers, often located in courthouses or law libraries, that provide individuals with legal information on a one-on-one basis or through workshops. These centers often maintain computer terminals as well as a collection of plain language self-help materials.

**Legal self-help services:** Services provided by courts, other government agencies, and legal services organizations to help self-represented litigants gain access to information about the law (e.g., landlord-tenant law) and legal processes and procedures. These services inform litigants, enable them to understand their specific situation and assess their legal options, and help them with actually pursuing their case.

**Librarian's Axiom:** The consistent finding that use of public libraries in the United States increases during economic downturns, as people seek help from libraries and librarians with processes such as accessing and filling out online job applications, preparing their resumes and cover letters, and acquiring information-related skills that will help to increase their employability. This finding dates all the way back to 1880!

**Library anxiety:** Feeling fear and anxiety about using a library and/or asking a librarian for assistance. Library anxiety can be caused by many different factors, including a (potential) user's perception that library staff are unapproachable and too busy to help them, an inability to identify and/or articulate one's information need, a perception that the library is not a welcoming and safe place, and a lack of knowledge about and comfort with using the library's resources and services. Library anxiety can lead to people not using a

library's resources or services. They will choose instead to use resources that they perceive to be more easily accessible to them, which encourages satisficing. In addition, even if someone does step foot in a library or use a library database, they may be reluctant to ask a librarian for much-needed assistance, which can make the search process more difficult than it needs to be. And, because the search process becomes arduous, people become increasingly frustrated and may, in fact, end their search before they have satisfied their information needs.

**Library database:** Library databases are databases that are purchased by libraries from vendors and made available to the library's patrons. These databases often (though not always) contain the full text of scholarly articles on a particular topic. An example of a library database that is very relevant to our field is Library & Information Science Source.

**Limits:** Many library databases (and Google to some extent) enable users to limit their search results based on various characteristics, such as whether an article has been peer reviewed, whether it has been indexed using a particular subject term, whether it was published during a particular time period, and whether it was written in English.

**Literature review:** A summary of the relevant literature in a particular area. Researchers frequently review the literature to identify a gap in what has been investigated when designing a research study. When researchers report their study results, they often provide a literature review before introducing the gap in the literature that they aimed to address with their study.

**Log analysis:** Sometimes referred to as "transaction log analysis," this method entails analyzing logs of users' online activities, such as the queries they have posed to a search engine.

**Meta-analysis:** The process of analyzing data that has been gathered across multiple research studies investigating similar research questions. One major benefit of meta-analysis is that any findings reached in this manner are more likely to generalize beyond the specific populations studied, as they are based on a larger (and often more diverse) set of subjects. However, meta-analyses are frequently hampered by researchers' use of different research questions, various data collection instruments (such as surveys), and varying (and sometimes inadequate) reporting of their findings.

**Misinformation:** Inaccurate information. Unlike disinformation and fake news, misinformation is not deliberately communicated with the express intent of deceiving the reader.

**Mixed-methods research:** Research that entails the use of both quantitative and qualitative research methods. For example, a researcher may first conduct a survey in order to identify how frequently people use each of ten different information sources and then conduct interviews with them to find out why they choose to rely on these sources.

**Mixed questions:** Questions that provide respondents with some fixed response options but also allow respondents to provide an open-ended answer. (e.g., "What is your favorite color?  Red  Green  Blue  Yellow  Other: \_\_\_\_\_").

**Monitoring:** Taking actions to try to keep up to date with regard to a particular topic. For example, you might sign up for a Google Alert (<https://www.google.com/alerts>) to receive all newly crawled information on some particular topic that is of interest to you.

**Neutral questioning:** Using open-ended questions that allow the user to describe their information needs in their own words. The goal of this technique is for the information professional to understand the query from the inquirer's point of view. Neutral questions tend to be most useful early on in an interaction, and it can be beneficial to subsequently switch over to closed questions to verify that one has correctly understood the user's information need.

**NVivo:** A software package used for qualitative data analysis. Using NVivo, researchers can assign various tags to individual interview excerpts, thereby facilitating the grouping of

related passages and the identification of themes that emerge across a set of interviews.

**Observation:** A data collection method that involves watching people as they engage (or not) in particular behaviors. Observation can be anywhere on a continuum from nonparticipant observation (in which the researcher does not involve themselves in the situation) to participant observation (in which the researcher actively engages in the situation).

**Open access:** Material that is freely available on the internet.

**Open-ended questions:** Questions that do not require study participants to select from a fixed set of response options when responding. For example: "How do you go about looking for information when your child is not feeling well?"

**Outcomes:** An assessment measure that is frequently more qualitative in nature. Outcomes are the actual impacts of your product, service, etc., on your users and/or their communities. For example, a library might seek to investigate the difference(s) they have made in their patrons' lives, such as that they helped someone to obtain a job or return to school to get a degree.

**Outputs:** An assessment measure that is generally quantitative in nature. Outputs are a measure of your achievements, without regard to the impact of your achievements on your users, their family members, or their communities. For example, a library might count up the number of library visitors who posed a question at their reference desk over the past year. Similarly, an app developer might calculate what percentage of their users rated their app as "excellent."

**PageRank:** The search algorithm developed by Google founders Larry Page and Sergey Brin in 1996. PageRank gives greater weight to Web pages that have many incoming links, particularly if those incoming links have high PageRanks (i.e., many incoming links), placing them toward the top of a user's search results set. PageRank basically approximates the quality of a Web page based on the number of incoming links it has.

**Participatory design:** The process of involving a technology's intended users, as well as any other type of stakeholders (such as employers), in the design of the technology, from initial idea generation to prototyping and production. Designers benefit from participatory design because they not only learn about users' actual needs, preferences, skills, knowledge, and goals but also empower users to have a hand in shaping the technology to best fit with their needs, preferences, and goals.

**Peer review:** A central part of the scholarly communication system in which an author's peers are asked to review the author's work and provide an informed judgment as to whether they believe the author's work should be published. Generally, peer reviewers can state that they feel a paper should be published as is, published with minor revisions, published with major revisions, rewritten and resubmitted, or just outright rejected. Peer reviewers are expected to provide substantial evidence for their judgments, as well as feedback that will assist the author in improving their work. Peer reviewers generally remain anonymous to the author of the paper under review.

**Pertinence:** An assessment as to whether information is of the highest relevance to a user's information need. Library and information science researcher and professor Tefko Saracevic (2007) equated pertinence with cognitive relevance, pointing out that information is pertinent if it is both novel and understandable to the user. Some researchers have gone further, equating pertinence with usefulness.

**Plain language materials:** Legal documents, such as court forms, that have been written with the aim of making them clear, concise, well-organized, and understandable. Self-represented litigants are better able to understand and fill out plain language forms, which helps to ease the burdens on judges and the clerk's office to try to correct their errors. They also enhance the ability of the legal system to serve limited English proficiency (LEP) individuals.

**Population:** The group of people who are the focus of a researcher's study. For example, a researcher may investigate the information needs of immigrants from South Korea who have recently arrived to the Washington, DC, area.

**Precision:** One of the two metrics (along with recall) that are frequently used to assess the effectiveness of information retrieval systems, such as search engines. Precision is a measure of the relevance of a set of search results. It is the proportion of retrieved results that are actually relevant to the user.

**Probing:** Following up on an interviewee's answer to a question posed to them by a researcher. For example, a researcher may ask an interviewee to explain why they trust health information that they see on social media. As the interviewee is explaining, they may mention something that is of particular interest to the researcher. The researcher can probe to find out more from the interviewee about this particular topic.

**Prototyping:** The process of building a tangible model (whether paper or digital) to reflect your initial design ideas for a particular information technology. Prototypes enable information professionals to obtain user feedback and draw on it to guide their continued work on designing and developing the technology.

**Proximity searching:** Searching for two or more keywords (or phrases) that are placed together or within a particular number of words of each other in the target document(s). Most library databases support several forms of proximity searching, including searching for phrases (e.g., "information behavior"), searching for words that appear within a particular number of words from each other in any order, and searching for words that appear within a particular number of words from each other in some particular order.

**Proxy information seeking:** Looking for information on someone else's behalf. For example, you might go on the Internet to obtain information about dog adoptions for your brother.

**Public libraries:** Nonprofit libraries that are open to the public. Public libraries are often funded, at least in part, by the taxes that we pay.

**Qualitative research methods:** Techniques used to gather and analyze information from study participants that describe how or why they do things, such as how they look for health-related information or why people trust information on the Internet.

**Quantitative research methods:** Techniques used to gather and analyze information that will help to answer numeric questions, such as how many people use a particular source, how much people trust various sources, and how often they use each of these different sources.

**Query reformulation:** Revising one's query terms and/or the order of the terms in one's query in order to try to get more relevant and useful search results.

**Question negotiation:** Coined by academic librarian and information science professor Robert S. Taylor (1968), question negotiation is the process a librarian and a patron go through as the librarian works toward gaining an accurate understanding of the patron's information need and assisting them with this need.

**Questionnaire:** A data collection method that entails presenting study participants with a predetermined list of questions. Questionnaires may be administered on paper, over the telephone, online, or in person.

**Recall:** One of the two metrics (along with precision) that is frequently used to assess the effectiveness of information retrieval systems, such as search engines. Recall is a measure of the comprehensiveness of a set of search results. It is the proportion of relevant results available in the system that are successfully retrieved and returned among the search results.

**Recruitment:** The processes by which a researcher elicits participation in their study. For example, a researcher could recruit participants by emailing a student listserv or by posting flyers in a grocery store.

**Reference list:** Sometimes referred to as a “works cited list,” this is a list of all of the articles, books, etc., an author has drawn upon in writing their paper, whether they have directly quoted from these articles or drawn from them in a more general sense.

**Relevance:** An assessment of whether information is related to a particular information need. There are various kinds of relevance, ranging from simply “on topic” to pertinent (i.e., most relevant) to actually useful for the situation at hand.

**Reliability:** The degree to which you will get the same results if you repeatedly conduct a measurement under the same conditions. For example, we would not deem a bathroom scale to be reliable if it gives inconsistent results.

**Research:** The processes used to gather new knowledge about something in the world, such as about people and their information behaviors.

**Research design:** A researcher’s overarching approach to conducting a research project. Research design encompasses a researcher’s decisions relating to how they will recruit participants, what strategies they will use to collect data from them, and what techniques they will use in order to analyze this data. Decisions relating to research design should flow from the specific research questions under investigation.

**Research ethics:** Researchers must treat their study participants ethically – that is, researchers must not harm or deceive them; their participation must be informed and voluntary; and their data must be kept completely confidential. When conducting social science research, the golden rule applies – do not do to anyone anything you would not want done to you. Keep your participants’ well-being in mind at all times, respect them, be honest with them, respect their autonomy, and protect them (and their data) from any potential harm.

**Research methods:** The set of techniques that researchers use in order to conduct their investigations. Research methods include recruitment strategies, data collection methods, and data analysis techniques.

**Research problem:** The problem that a researcher is setting out to investigate and/or address. For example, a researcher may investigate why some parents are not having their children vaccinated.

**Research process:** The set of steps that researchers follow in carrying out an investigation. Researchers’ paths through these steps vary and are often iterative rather than linear. Additionally, the various steps frequently overlap with one another.

**Research question:** The specific question that a researcher is setting out to investigate, such as “Why do anti-vaxxers believe that vaccinations cause autism?”

**Rival explanations:** Other possible explanations for a researcher’s findings. For example, a researcher might conduct an experiment in order to see if students will satisfice when it comes to their homework if they are under time pressure. If/when they find support for their hypothesis, it will not be possible for the researcher to conclude that the time pressure is what caused the participating students to satisfice unless they’ve controlled for all other possible explanations, such as the students’ level of motivation and interest in the particular assignment. In this example, motivation may be a rival explanation for the researcher’s finding that students satisfice when it comes to their homework.

**Sample:** The subset of the study population that actually participates in a researcher’s study. If a researcher is investigating the information needs of immigrants from South Korea who have recently arrived in the Washington, DC, area, the population is this particular group of immigrants and the sample is the subset of this population that agrees to participate in their study (perhaps fifteen people have agreed to be interviewed by the researcher – that is the sample).

**Satisficing:** Coined by economist and political scientist Herbert A. Simon (1996), satisficing is a merging of the terms “satisfy” and “suffice.” People frequently satisfice; for example,

they may find information that is just “good enough.” It may not be comprehensive or even of very high quality. They may be unwilling to expend extra effort beyond obtaining information that they deem to be “good enough,” given their current task or goal.

**Scholarly communication system:** The processes scholars, such as information behavior researchers, use to share their work and communicate their findings. A central part of the scholarly communication system, as it has stood for more than 350 years, is peer review.

**School libraries:** Libraries that are in an elementary, middle, or high school.

**Secondary data analysis:** The process of analyzing an externally generated data set for one’s own research. Secondary data analysis enables a researcher to skip the data collection step; however, it also imposes some important disadvantages, as the researcher has no say into matters such as what questions get asked, how they’re worded, the order in which they’re asked, and the response options that are provided to respondents.

**Selective attention:** People often choose to pay attention to some information while ignoring other information. For example, they may choose to only pay attention to information that appears to confirm what they already “know” and dismiss everything else.

**Selective exposure:** People often make conscious decisions as to which type(s) of information they want to be exposed to. For example, they may seek to only be exposed to information that agrees with their existing beliefs.

**Self-represented litigants:** People who are navigating the legal system without a lawyer. The number of people who are representing themselves has been steadily increasing throughout the twenty-first century, particularly in certain areas, such as family law, landlord/tenant, and small claims cases.

**Sense-making:** Communications professor and information behavior researcher Brenda Dervin (1992 and 2003) and her colleagues have been developing sense-making since 1972. Sense-making is simultaneously a theory, a set of methods, and a body of findings that focuses on how people make sense of things within their everyday lives. To make sense of our worlds, we engage in both gap-defining (perceiving and defining a gap in our knowledge) and gap-bridging (figuring out how to conceptualize, construct, and use bridges that enable us to cross these gaps).

**Serendipity:** A chance encounter with useful information that one had not been actively seeking at the time. Serendipity is sometimes referred to as “information encountering.” Serendipity is actually quite common and may result from activities such as browsing the bookshelves at your local library.

**Situation:** The set of circumstances surrounding an individual’s need. Although situation and context are often used interchangeably, situation is actually much narrower than context. For example, your context might be that you’re a college student, and your current situation is that you need to find articles to read for a paper that is due in class tomorrow.

**Snowball sampling:** The process of recruiting participants for a study through other participants. For example, a researcher may ask each of their interviewees to have their friends and family members contact the researcher if they might like to participate in the study, as well.

**Social determinants of health:** Factors such as an individual’s socioeconomic status, educational attainment, employment, neighborhood, and social support network that affect people’s health-related risks and outcomes. Health inequities are largely caused by disparities in social determinants of health. Information access and health literacy are both key social determinants of health.

**Social network analysis:** The process of analyzing the components, as well as the relationships between the components, in a social network. For example, a researcher might conduct a social network analysis of all of the individuals who follow a particular

blog, looking at who communicates with whom and what types of information they share with one another.

**Storyboarding:** A method used by UX and usability researchers to visually represent how a user engages with a specific technology or interface. Storyboards help designers to quickly, visually highlight various contexts of technology use, generate new ideas, and/or communicate specific user actions and goals, typically for a specific set of actions (e.g., a user story about filing emails by topic).

**StoryKit:** A mobile application for creating and sharing multimedia stories on iOS mobile devices (e.g., iPad, iPhone). StoryKit was launched in the Apple App Store in September 2009 and is still available for use on iOS devices with a 32-bit architecture (only works on 32-bit systems prior to iOS version 11).

**Think-aloud:** A data collection technique that researchers use in order to learn more about the nonobservable internal processes (such as thoughts and feelings) of the study participants that they are observing. For example, a researcher might investigate the experiences of users as they interact with an app by observing them. By adding a think-aloud component to the study, the researchers can elicit participants' thoughts and feelings about the app and their reasoning behind each of their actions.

**Triangulation:** The use of multiple research methods (data collection and/or data analysis methods) within one study, drawing on the strengths of one method to help to compensate for the weaknesses of another. Triangulation can help to yield findings that are more accurate, more comprehensive, and richer.

**Truncation:** Most library databases enable users to improve the recall of their searches by using truncation, which will retrieve all items that begin with a particular word stem (e.g., *librar\** would retrieve *library*, *libraries*, *librarian*, *librarians*). It is important to keep in mind that the specific symbol used to indicate truncation (the asterisk in the example provided here) varies from database to database.

**Uncertainty:** Feeling unsure about some topic, task, or problem. Uncertainty may drive information seeking; however, people sometimes avoid information in order to hang on to (or even increase) their uncertainty.

**Usability:** The ease with which users can interact with the interface of an information technology. The usability of an information technology is central to the user experience.

**Usability testing:** Evaluating an information technology to determine how easily actual or intended users can make use of the technology to complete a task and/or reach some goal.

**User-centered design:** The process of involving users at all stages, from the very beginning of the design and development of the technology all the way through to postevaluations conducted after the technology has been deployed. Participatory design expands the concept of user-centered design by inviting users to partner in the process.

**User experience (UX):** All aspects of a user's interactions with an information technology, whether a system, device (such as a tablet), website, piece of software, or an application. UX encompasses both accessibility and usability, as well as the emotions that such technologies evoke (e.g., joy or frustration).

**User Experience Honeycomb:** Developed by information architecture and findability consultant Peter Morville (2004), the User Experience Honeycomb depicts seven important facets of the user experience – the extent to which the technology is (1) useful, (2) usable, (3) desirable, (4) findable, (5) accessible, (6) credible, and (7) valuable.

**User experience (UX) research methods:** The methods used by information professionals (such as user experience researchers, usability testers, usability specialists, and usability/human factors engineers) to inform the initial design of a new information technology and to assess the overall user experience and the usability and usefulness of

an existing information technology. Some examples of UX research methods include surveys, interviews, focus groups, card sorting, first-click testing, wireframe testing, and usability evaluations.

**User requirements analysis:** A process frequently used by information systems and software designers to learn about the specific needs and requirements of their users.

**Validity:** The extent to which a researcher is accurately measuring what they're intending to measure. For example, the validity of IQ tests has been questioned. Do such tests really measure an individual's intelligence?

**Visceral information need:** A vague sense that one is missing important information on some particular topic. People who have a visceral information need are unable to describe what information they need; they just know that some information is missing from their knowledge on a particular topic.

**Vocabulary problem:** George Furnas (1987), an information science professor and human-computer interaction/information retrieval researcher, coined this phrase to describe one of the most common causes of information overload. The words that an information creator used to describe their document may not match the words that an individual seeking that document includes in their search query. This mismatch can result in either a failure to retrieve any results or the return of many search results that do not actually match the user's need, drowning them in a sea of irrelevant results.

**Wayfinding systems:** Systems that help users navigate physical environments (such as libraries), using visual clues to enhance their experience. Important elements of wayfinding systems include signs that help people locate the services/resources they need and clear labeling of these resources. Without an adequate wayfinding system in place, library users may get lost and frustrated, choosing to give up before they find the information they are looking for.

**Wildcards:** Most library databases support the use of wildcards to retrieve documents that contain a particular sequence of letters. Unlike the truncation symbol, which can stand for any number of characters, each wildcard symbol represents exactly one letter. For example, a query of *fr??d* would retrieve *freed* and *fried*, but not *friend*. Some library databases also enable users to use a hash wildcard, meaning that the wildcard can represent no letters or one letter. For example, the query *color#r* would retrieve both *color* and *colour*. The particular symbols (e.g., the question mark and the pound sign) used vary from database to database.

**Willingness to return:** Proposed by library and information services professor and information behavior/community informatics researcher Joan C. Durrance (1995) as a measure of the success of a reference interaction, this entails asking a patron who has just posed a question to a librarian whether they would be willing to return to that same librarian to ask another question in the future. Durrance found that the vast majority of patrons are willing to return to a librarian if the librarian had seemed interested in their question, had good listening skills, identified the actual information need behind the user's question(s), and/or had used open-ended questions effectively.

**Wireframe testing:** A method used by UX and usability researchers to assess the ease with which users navigate a particular information architecture, such as the layout of the content on a website.

**Youth information behavior:** The information behavior of children and/or teens.

**Zipf's Principle of Least Effort:** People often try to minimize the amount of effort that they have to put into a task. For example, people may try to save time by scanning through just the first page of search results, even though there may be better (more relevant and/or high quality) results on a subsequent page.

**Zones of intervention:** Library and information science professor and information literacy/information behavior researcher Carol Collier Kuhlthau (2004) pointed out the importance of information professionals knowing when their offers of help will most likely be perceived by the user to be helpful. She identified five “Zones of intervention”: Zone 1: The user determines their own information need and obtains the sources they need themselves, and the information professional plays the role of “organizer”; Zone 2: The user needs one “right” source and the information professional plays the role of “locator”; Zone 3: The user needs some relevant sources and the information professional plays the role of “identifier”; Zone 4: The user needs a sequence of relevant sources and the information professional plays the role of “advisor”; and Zone 5: The user needs more holistic, ongoing help with the overall search process and the information professional plays the role of “counselor.”

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## About the Authors

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**Ursula Gorham** ([ugorham@umd.edu](mailto:ugorham@umd.edu)) is a senior lecturer in the College of Information Studies at the University of Maryland, College Park (the iSchool). She currently serves as the director of the Master of Library and Information Science program in the iSchool. She is admitted to practice law in Maryland and previously served as a law clerk in Maryland appellate and federal bankruptcy courts. Dr. Gorham's research and teaching reflect her passion for information literacy, particularly within the realm of legal and government information. Dr. Gorham's research has been published in *Government Information Quarterly*, *Public Library Quarterly*, *Journal of Open Access to Law*, *Information Polity*, *Law Library Journal*, and *First Monday*, among others. She published her first solo-authored book, *Access to Information, Technology, and Justice: A Critical Intersection* in 2017. She has also coauthored two books: *Libraries, Human Rights, and Social Justice: Enabling Access and Promoting Inclusion* (2015) and *Public Libraries, Public Policies, and Political Processes: Serving and Transforming Communities in Times of Economic and Political Constraint* (2014). She also co-edited *Advances in Librarianship: Perspectives on Libraries as Institutions of Human Rights and Social Justice* (2016).

**Elizabeth (Beth) Bonsignore** ([ebonsign@umd.edu](mailto:ebonsign@umd.edu)) is an assistant research scientist at the College of Information Studies (the iSchool) and the University of Maryland's (UMD) Human-Computer Interaction Lab (HCIL). Her research focuses on the design of technology-mediated social experiences that promote new media literacies, arts-integrated science learning, and participatory culture. As the director of KidsTeam, an intergenerational, participatory design team at UMD's iSchool, her research efforts involve co-design partnerships and meaningful play *with* youth. Her work aims to empower children, young adults, and their families to harness the everyday funds of knowledge that they already possess to access and achieve higher levels of learning and participation in civic society. She also studies interactive, multimodal narratives and the roles they play in helping underrepresented youth engage in lifelong learning. She often works

with family members of the youth she co-designs with to connect with the larger sociocultural ecosystems in which they learn and grow. She has published peer-reviewed conference and journal articles on participatory design, information literacy, and learning sciences-based projects, and co-edited a book on *Participatory Design for Learning* with associate professors Betsy and Carl DiSalvo (Georgia Tech) and assistant professor Jason Yip (University of Washington). She has also served as an associate chair for the Association for Computing Machinery's (ACM's) Computer-Human Interaction (CHI), CHI-PLAY, and Interaction Design and Children (IDC) conferences since 2016.