Chapter 3

Review of the Related Literature

Many who have conducted research before you have laid foundational elements—not only previous research findings but also insightful concepts and theories—on which you might productively build. As groundbreaking physicist and mathematician Isaac Newton wrote in 1675, "If I have seen further it is by standing on the shoulders of giants."

Learning Outcomes

3.1 Describe several purposes that a literature review can serve during the planning of a research project.

3.2 Explain how you might effectively use five general resources to locate related literature: (a) the library catalog, (b) online databases, (c) reference

librarians, (d) Internet search engines, and (e) other researchers' reference lists.

3.3 Describe concrete strategies you can use to evaluate, organize, and synthesize literature related to a research problem.

As noted in Chapter 2, reading the literature related to your topic of interest can help you formulate a specific research problem. It can also help you tie your problem—and, later, your findings as well—to a larger body of research and theoretical understandings about your topic. In this chapter we discuss the importance of the literature review and give you suggestions for reviewing the related literature thoroughly but efficiently.

UNDERSTANDING THE ROLE OF THE LITERATURE REVIEW

Research proposals and research reports typically have a section—in the case of a thesis or dissertation, often an entire chapter—that describes theoretical perspectives and previous research findings related to the problem at hand. Its function is to review—to "look again" at *(re + view)*—what others have done in areas that are similar, though not necessarily identical to, one's own topic of investigation.

As a researcher, you should ultimately know the literature related to your topic *very, very well.* An extensive literature review has many benefits:

1. It can help you ascertain whether other researchers have already addressed and answered your research problem or at least some of its subproblems.
2. It can offer new ideas, perspectives, and approaches that may not have occurred to you.
3. It can inform you about other individuals who conduct work in this area—individuals whom you may wish to contact for advice or feedback.
4. It can alert you to controversial issues and gaps in understanding that have not yet been resolved—issues and gaps you might address in your own work.
5. It can show you how others have handled methodological and design issues in studies similar to your own.

6. It can reveal sources of data you may not have known existed.
7. It can introduce you to measurement tools that other researchers have developed and effectively used.
8. It can help you interpret and make sense of your findings and, ultimately, help you tie your results to the work of those who have preceded you.
9. It can bolster your confidence that your topic is one worth studying, because you will find that others have invested considerable time, effort, and resources in studying it.

Simply put, the more you know about investigations and perspectives related to your topic, the more effectively you can address your own research problem.

In most instances, researchers begin their review of the literature early in the game, and they draw on existing theories and previous research studies to help them pin down their research problem. Extensive literature reviews *up front* are especially common in quantitative research, where they can help researchers formulate specific *a priori* hypotheses in conjunction with their problem or its subproblems. In some forms of qualitative research, however, researchers worry that too much knowledge about current perspectives and previous findings might unduly bias their own data collection and interpretation; hence, they postpone a thorough literature review until relatively late in the research process (e.g., see the discussion of grounded theory research in Chapter 9).

STRATEGIES FOR LOCATING RELATED LITERATURE

You might find literature related to your topic in a number of places—for instance, in books, journals, newspapers, government publications, conference presentations, and Internet websites. Obviously you can't simply wander aimlessly through the library stacks or Internet with the hope that you will eventually stumble on items that may help you; you must focus your search from the very beginning.

A good way to start is to identify one or more keywords—words or short phrases summarizing your research topic—that can point you toward potentially useful resources. A prime source of such keywords is your statement of your research problem. For example, imagine that you want to investigate possible reasons why some children bully other children at school. Obvious keywords for this topic are *peer relationships, bullying,* and *aggression.* These are very general concepts, but they should get you started. They will lead you to thousands of potential resources, however, and so you will soon want to identify more specific keywords. As you begin to look at books, journal articles, websites, and other resources related to your topic and initial set of keywords, you should come across words and phrases that more closely capture what you want to study—for the bullying problem, these might include such terms as *social goals, social cognition,* and *cyberbullying*—and may also help you focus your research problem a bit more.

Armed with your keywords—which you will undoubtedly continue to revise—you can proceed in several directions. In the following sections, we describe five good starting points: the library catalog, online databases, reference librarians, the Internet, and other researchers' citations and reference lists.

Using the Library Catalog

The library catalog has come a long way from the tool it was in the mid-20th century. If you were a student in, say, 1960, when you entered the library you would go straight to the card catalog—a set of free-standing dressers-of-sorts with many small drawers containing 3-by-5 index cards. The catalog would have three cards for every book in the library—one card each for a book's title, author, and general topic. You would rifle through the cards in search of books relevant to your topic and then write down the call numbers of books you wanted to track down in the library's numerous shelves of books (i.e., the "stacks"). If you were conducting an extensive literature review, the process might involve going through drawer after drawer in the card catalog, writing down a lengthy list of books and call numbers, and then heading to the stacks

to determine whether or not each book you wanted was currently available. The whole process could be incredibly tedious and time-consuming.

In today's college library, a researcher's plan of attack is entirely different. Although you may occasionally find a small public library that still uses a physical card catalog, college and university libraries rely almost exclusively on electronic catalogs of their collections. In place of those rows upon rows of index-card drawers are computer terminals at which users can quickly locate a library's holdings related to particular authors, titles, keywords, or call numbers. The database will tell you on what floor of the library—and, if relevant, in what building or on what branch campus—a particular book can be found. (Note that some widely used books are kept in the library's reserved books section rather than in the stacks; you must read these books in the library itself, as they cannot be checked out.) The database will also tell you the status of a book—whether it's currently available or, if not, when it is due to be returned. If you have any questions about how to use the library catalog and its many features, don't be afraid of "looking stupid"—ask a librarian to show you the basics.

A good college or university library will almost certainly have a number of books relevant to your research topic. Some books will be written entirely by one or two individuals. Others may be edited collections of chapters written by a variety of experts on the topic. And don't overlook general textbooks in your discipline. A good textbook can give you a broad overview of a topic, including important concepts, theoretical perspectives, a sampling of relevant research, and critical references.

The library's collection of academic journals, popular magazines, and newspapers—collectively known as periodicals—is another indispensable resource. The library catalog will tell you which periodicals the library owns, where each one is located, and the one or more forms (paper, electronic, microform) in which particular volumes and issues can be found. For instance, if the library has a periodical in paper form, you will find most volumes in the library stacks—usually in a section of the library devoted specifically to periodicals—but you are apt to find recently acquired, unbound issues (say, from the past year or two) on a separate set of shelves near the main desk for the periodicals section. Some university libraries organize and shelve their paper periodicals by call number; this approach enables you to find periodicals about any single topic close together, but you must know the call number(s) relevant to your discipline and topic. Other university libraries organize and shelve paper periodicals alphabetically by title; this approach enables you to find any particular periodical without having to consult the library catalog, but you will most likely go to many different shelves to retrieve all articles relevant to a particular literature review.

University libraries typically also have access to many periodicals in electronic form, which you can retrieve from a computer terminal (more about accessing electronic copies in the upcoming section on online databases). Finally, your library may have some periodicals (especially older ones) in *microform.* The microform area of a library is easy to spot, as it will have numerous file cabinets containing *microfilm, microfiche,* and the like, along with several large devices for viewing them. The devices may seem intimidating to a novice researcher, but they are quite easy to use once you have had a little practice. Don't be afraid to ask someone behind the periodicals desk to demonstrate how to use them.

One general rule of thumb is to use books and periodicals with recent copyright dates. The more recently a book or article has been written, the more likely it is to give you a sense of current perspectives in your field and alert you to recent research findings that may be pertinent to your research problem. You should ignore this rule, of course, if you are specifically interested in how perspectives about your topic have changed over the years.

A second rule of thumb is to focus on publications that are likely to have credibility with experts in the field. For example, credible books often come from publishing houses and university-affiliated publishers that specialize in scholarly works (e.g., Sage, Routledge, Oxford University Press). And as previously noted in Chapter 1, reputable journals are typically *juried*, in that notable scholars have carefully reviewed article manuscripts before they ever appear on the printed page; a quick look at the names and affiliations of a journal's editors and editorial board can give you a good sense of the rigor with which articles have been screened. We urge you *not* to

be seduced by best-selling paperbacks on trendy topics, as their authors and contents have not necessarily been vetted by experts.

USING TECHNOLOGY

If you have access to the Internet from your home computer, then you already have access to countless online library catalogs around the world. An Internet search on Google, Bing, or Yahoo! can quickly give you links to many university and public library catalogs. Typically the Internet home page for your own institution will also have a quick link to the library and its catalog.

A Few Words About Call Numbers   The *call numbers* referred to earlier are the unique identification codes that books, journals, and similar items are given. A book's call number provides an "address" that enables you to find it in the library stacks. Books are coded and arranged on the library shelves in accordance with one of two principal classification systems, which divide areas of human knowledge in somewhat different ways:

- ■ *The Dewey decimal (DD) classification system.*   Books are cataloged and shelved according to 10 basic areas of knowledge and subsequent subareas, each divided decimally. The Dewey decimal system is the principal classification system used in many public libraries.
- ■ *The Library of Congress (LC) classification system.*   Books are assigned to particular areas of knowledge that are given special alphabetical categories. This system is widely used in college and university libraries.

Table 3.1 provides a rough overview of how the two systems generally classify many traditional academic subject areas. For each subject area listed in the table, the entries in the DD column to its left and the LC column to its right provide either starting points or general ranges for the Dewey decimal and Library of Congress designations, respectively. You can find descriptions of more specific categories and subcategories on many Internet websites.

TABLE 3.1 ■ A General Conversion Chart: Dewey Decimal Classification System (DD) Versus the Library of Congress Classification System (LC) for Various Subject Areas

DD	Subject	LC	DD	Subject	LC
630	Agriculture	S	070	Journalism	PN
301	Anthropology	GN	400	Language	P
930	Archaeology	CC	340	Law	K
700	Art	N	020	Library and Information Sciences	Z
520	Astronomy	QB	800	Literature	P
920	Biography	CT	510	Mathematics	QA
570	Biology	QH	610	Medicine and Public Health	QS–QZ, W
580	Botany	QK	355	Military Science	U
650	Business	HF	780	Music	M
540	Chemistry	QD	100	Philosophy	B
004–006	Computer Science	QA	530	Physics	QC
550	Earth Sciences	QE	320	Political Science	J
330, 380	Economics and Commerce	HB–HJ	150	Psychology	BF
370	Education	L	200	Religion	B
620	Engineering	T	500	Science (General)	Q
910	Geography	G	301	Sociology	HM
350	Government	JF, JK, JS	790	Sports and Recreation	GV
930–995	History	D, E, F	600	Technology	T
640	Hospitality	TX	590	Zoology	QL

Be aware, however, that neither the Dewey decimal system nor the Library of Congress system is as simple and cut-and-dried as Table 3.1 might suggest, in part because virtually any academic discipline includes many topics and draws from many research areas and—often—from other disciplines. Furthermore, we authors have found that books in our own areas of expertise are not always classified exactly as we ourselves might have classified them.

Browsing the Library's Holdings   Although keywords and knowledge of specific book titles and authors can get you off to a good start in locating helpful volumes in your library, they will give you *only* a start, because you probably won't be able to think of every potentially useful keyword, and you certainly won't be aware of every book and author relevant to your topic.

We therefore suggest that you also browse the library, either physically by walking among the stacks or electronically by "browsing" the entries in the library's online catalog. In many cases, when one goes to a library shelf to get a particular book or journal, the most useful information is found not in the material that was originally targeted, but rather in one or more volumes nearby.

Remember, too, that most academic disciplines are becoming increasingly interdisciplinary in both their problems and their methodologies. For example, to identify the needs and shopping patterns of different populations, marketing researchers often draw on sociologists' and geographers' concepts and data collection techniques, and psychologists can learn a great deal about human thought processes by using the positron emission tomography (PET) and magnetic resonance imaging (MRI) technologies of neurophysiologists. Thus, you are apt to find helpful sources under more than one range of call numbers. Good researchers are flexible and creative in their searches for relevant literature.

USING TECHNOLOGY

Using Online Databases

Although the library catalog will tell you which periodicals your library owns and in what form it owns them, it won't tell you the specific articles that each volume of a journal contains. Virtually all college and university libraries provide access to many **online databases** that enable searches of thousands of journals and such other sources as books, chapters in edited books, dissertations, government documents, technical reports, and newspapers. Table 3.2 lists examples.

A typical database allows you to limit your search in a variety of ways—perhaps by keywords, title, author, year, source (e.g., journal title), language, or any combination of these. Many databases focus on particular disciplines and subject areas. As an example, let's consider PsycINFO, a database that includes information not only about sources in psychology but also about psychology-related sources in such disciplines as physiology, sociology, anthropology, education, medicine, and business. As this edition of *Practical Research* goes to press, PsycINFO works as follows:

1. When you enter the database, you can conduct either a "basic search" (the default mode) or an "advanced search." If you click on "advanced search," you can type one to three words or phrases in boxes at the top of the screen. In pull-down menus to the right of the boxes, you can indicate whether each word or phrase you have typed is an author, title, keyword, word or phrase in the abstract, or some other entity.

2. In pull-down menus to the left of the second and any subsequent boxes at the top of the screen, you can tell the computer to

   a. Identify only those items that include *all* of the words/phrases you have entered (for this, you select the "and" option)
   b. Identify items that include *any* of the words/phrases you have entered (for this, you select the "or" option)
   c. Exclude items that have one of the words/phrases you have entered (for this, you select the "not" option)

3. Options in the lower portion of the computer screen allow you to limit your search results still further, perhaps by specifying a particular journal, range of publication dates, population, age-group, or language.

TABLE 3.2 ■ Examples of Online Databases

Database	Subject Area(s) Covered
Academic Search Premier	Education, humanities, multicultural issues, sciences, social sciences
America: History and Life	History of the United States and Canada
AnthroSource	Anthropology
Applied Science and Technology Source	Applied sciences and technology (e.g., computing, engineering, resource management, telecommunications, transportation)
Art Source	Broad range of art topics (e.g., advertising, architecture, art history, folk art, graphic arts, video)
Biological Abstracts	Biology, medicine
Business Source Premier	Business, economics
EconLit	Economics
ERIC (Educational Resources Information Center)	Education and education-related topics
Historical Abstracts	World history (excluding the United States and Canada; for these, use America: History and Life)
IngentaConnect	All disciplines
JSTOR	Business, fine arts, humanities, sciences, social sciences
Linguistics and Language Behavior Abstracts (LLBA)	Language
MathSciNet	Mathematics (pure and applied), statistics
Medline	Dentistry, health care, medicine, veterinary medicine
National Criminal Justice Reference Service Abstracts	Courts, crime, justice, law enforcement, victimization
PAIS (Public Affairs Information Service) International	Public and social policy, social sciences
ProQuest Dissertations and Theses: Full Text	All disciplines
PsycINFO	Psychology and psychological aspects of other disciplines (e.g., physiology, sociology, anthropology, education, medicine, business)
Sociological Abstracts	Sociology and related topics in the social and behavioral sciences
SPORTDiscus	Physical education, physical fitness, recreation, coaching, sports medicine
Web of Science	Humanities, sciences, social sciences
WorldCat	All disciplines

4. Once you have limited your search to some degree (at a minimum by completing Step 1), you click on the "Search" button near the top of your computer screen.

5. The next screen will either (a) give you one or more references or (b) tell you that it has come up empty-handed ("No results were found"). If references appear, you can click on their titles to view abstracts and, in some cases, see and download the entire articles or other texts. If your search has been unsuccessful, you probably need to eliminate one or more of the limitations you imposed on your original search—you should also check for spelling errors in what you have typed—and click on the "Search" button once again.

6. Each time you identify a potentially useful source, you can use one or more tools to keep track of it, perhaps adding it to an electronic folder, printing it, or e-mailing it to yourself. You might also import the source to a bibliographic database software program on your computer; we will examine such software later in the chapter.

As is true for some of the articles in PsycINFO, many databases provide entire documents. For example, ProQuest Historical Newspapers: *The New York Times* allows you to search—and then also read—news articles, editorials, letters to the editor, birth announcements, obituaries, advertisements, and virtually any other entry in any issue of the *Times* dating back to its first issue in 1851. Another good general resource is JSTOR (pronounced "jay-stor"), which contains electronic copies of articles from many journals in the sciences, social sciences, arts, humanities, business, and law.

One easy way to access a university library's online databases is through computer terminals located throughout the library building. Often a library's Internet home page will provide a link to its online databases, and users may be able to access them on their home computers as well as at the library. However, because a library pays large annual fees for its online databases, it typically restricts off-site use of them to current students and employees. Hence, students who want to use a database at home may need to enter a preassigned user name and password before gaining access to it. A reference librarian at your own library can give you the details.

Researchers not currently connected to a university have other possible ways to access online databases. Many professional associations give current members access to electronic copies of articles published in the associations' journals. Some online databases are available without charge on the Internet. An example is Google Scholar (scholar.google.com), through which you can search the general topics and contents of books, journal articles, and other scholarly works in a wide range of disciplines. Some of the websites it identifies provide complete articles and other documents you can download and print (e.g., look for sites labeled "pdf"), whereas others provide abstracts and links to companies that charge a service fee for the complete documents. Another, more specialized database—one especially helpful for researchers interested in medicine and related topics—is PubMed, developed and updated by the National Library of Medicine (nlm.nih .gov). And for documents produced by various federal agencies in the United States, you can use the Federal Digital System, or FDsys, developed and maintained by the U.S. Government Printing Office (gpo.gov/fdsys). Also, check out Google Books (books.google.com), which provides excerpts from—and in some cases the entire texts of—out-of-print books.

One especially helpful database during a literature search is the Web of Science, which can tell you which publications cite *other* publications. For example, imagine that you are particularly intrigued by a 1999 article in the journal *Nature Neuroscience* indicating that the human brain is not fully mature until its owner reaches adulthood in the 20-something age range (Sowell, Thompson, Holmes, Jernigan, & Toga, 1999). Given the rapid-pace advances in neuroscience in recent years, this article is an "old" one, and so you want to find more up-to-date articles on the same topic. In the Web of Science database, the "Cited Reference Search" option allows you to search the reference lists of all other articles in its database and find more recently published articles that cite the article by Sowell and her colleagues. If you were to use the Web of Science for this specific purpose (as we did), you would find that the Sowell and colleagues' article has been cited by hundreds of other researchers and so obviously has been an influential one in neuroscience.

Another invaluable database is WorldCat, which combines the library catalogs of thousands of academic libraries, large public libraries, and other specialized collections throughout the world. Through this database, you can identify libraries that have particular books, periodicals, visual materials, sound recordings, and other items that might be rare and hard to come by.

Our list of databases and their features is hardly exhaustive. Databases become more sophisticated with each passing year. Please don't hesitate to consult with a reference librarian about databases that might be especially suitable for your research purposes.

Consulting with Reference Librarians

When you visit the reference section of your library—and we urge you to do this very early in your literature search—you will almost certainly see one or more librarians sitting at the reference desk. These individuals are there for one reason only: to help you and others find needed information. They can show you reference materials you never dreamed existed. They can also demonstrate how to use the computer catalog, hard-bound reference resources, online databases, or any of the library's other resources.

Some new researchers are reluctant to approach a reference librarian for fear of looking foolish or stupid. Yet the reality is that library resources are changing so quickly that most of us can't possibly keep up with them all. Whatever you do, *don't* be afraid to ask librarians for assistance. Even as seasoned researchers, we authors sometimes seek the advice of these individuals; by doing so, we can often save ourselves a great deal of time and aggravation.

The best way to master the library as a research tool is to use it! Go in, explore, take stock of its resources; experiment with the various search options in its computer terminals; browse in the reference room; go into the stacks and browse some more. You may be surprised at what a magnificent research tool the library really is.

USING TECHNOLOGY

Surfing the Internet

We have already mentioned the Internet as a source of such free-access online databases as Google Scholar, PubMed, and Google Books. With each passing year, the Internet becomes an increasingly valuable source of information to researchers. As most of our readers already know, an Internet search begins with a **search engine** at a website such as Google, Bing, or Yahoo! These websites typically have a box in which you can type one or more keywords to start your search. Following are some general strategies to keep in mind when using search engines:

1. Use at least two keywords to limit your search. (For example, to locate research about children with autism, you might type the words *children* and *autism.*)

2. Type a plus sign (+) before any keyword you definitely want used in your search. (For example, to limit your search only to children who have autism, you should type "+children" and "+autism." Otherwise, you might get a listing of all resources involving children *or* autism, which would undoubtedly be a long list indeed.)

3. If you want to look for a phrase rather than a single word, put quotation marks around the phrase. (For example, if you are looking for the home page of the Autism Society, you should type "Autism Society" within quotation marks. This way, your search will be restricted to items specifically about that particular organization.)

Surfing the Internet will lead you to many different types of websites. For instance, it may lead you to government websites that can provide helpful documents and information, including those for the U.S. Census Bureau (census.gov), Department of Education (ed.gov), Department of Labor (dol.gov), National Aeronautics and Space Administration (nasa.gov), and U.S. Geological Survey (usgs.gov). Most professional associations have websites as well, and these sites often provide a wealth of information about their areas of expertise.

One site to which an Internet search will often lead you is Wikipedia (wikipedia.org), an online encyclopedia that virtually anyone can add to and edit. Wikipedia contains millions of entries on a diverse range of topics, with people adding new ones every day. In our experience, Wikipedia provides good general overviews of many topics and can help a novice researcher identify key concepts and issues related to a topic. Keep in mind, however, that *its contents are not juried:* There is no oversight of any entry's accuracy by experts in the subject matter at hand. Accordingly, although you might use ideas you find in Wikipedia to guide your subsequent searches, as a general rule *you should not—we repeat, **not**—use Wikipedia as an authoritative source about your topic.*

An Internet search may also lead you to research articles and opinion papers that individual researchers have made available on the Internet, and you can typically print such documents or download them to your own computer. We caution you to keep in mind that such articles and papers vary widely in quality. Although most academic publications have a review process that enhances the quality of the research articles they include, many unpublished research reports posted on the Internet have not yet been reviewed or judged by professional colleagues. Obviously you will want to read *any* research report with a somewhat critical eye, but you should be especially careful when you find research reports on the Internet that you cannot verify as the work of credible scholars.

In your searches of the Internet, you will probably have to wade through many listings that aren't terribly helpful. On the plus side, however, if you have access to the Internet from a home computer, you can browse anytime day or night—weekends, holidays, even 3:00 a.m. if you like. Libraries are sometimes closed, but the Internet is always open.

Whenever you find a useful resource on the Internet, you should make a note of where or how you found it. One common practice is to record the address (**Uniform Resource Locator**, or **URL**) at which you found the resource and the date on which you did so. Alternatively, many on-line documents posted since the year 2000 have a **Digital Object Identifier**, or **DOI**—a unique, permanent number that enables others to find a document again even if its precise location on the Internet has changed in the meantime. DOIs are especially helpful when research reports and other scholarly works are available only in electronic form (for more information, go to doi.org).

Using Citations and Reference Lists of Those Who Have Gone Before You

No library or computer search—no matter how extensive—is foolproof. Ultimately any search depends on the particular keywords you use and the particular databases you include in your search. One additional—in our minds, *essential*—resource is the literature reviews of researchers whose own writings you have consulted. Such reviews, especially if they have been published recently, can give you valuable guidance about seminal research studies and cutting-edge ideas related to your research topic. As a rule of thumb, we suggest that you track down *any references you see cited by three or more other researchers.* Such references are clearly influencing current work in your field and should not be overlooked.

The preceding paragraph brings us to another important point: Don't depend on what other authors say about a particular reference. Too often we have seen two or more authors misrepresent the work of a particular researcher in the same, particular way; apparently, they are reading one another's descriptions of that researcher's work rather than reading the researcher's own words! Whenever possible, *go to the original source and read it yourself.*

Considering all of the resources we have described in this chapter, you might be thinking that you will be spending the next 10 years conducting your literature review! Don't worry. In the Practical Application sections that follow, we describe (a) how to plan an organized and efficient literature search, and (b) how to distinguish between research reports that are and are not worth taking seriously.

PRACTICAL APPLICATION Planning a Literature Search

In Chapter 2 you learned how to select a research problem or question. You also learned that most problems, taken as a whole, are fairly complex and can be more easily solved when they are divided into two or more subproblems.

The main problem and subproblems provide a way to focus your attention as you read the literature. One concrete and effective approach, using either paper and pencil or brainstorming/mind mapping software, involves the following steps:

1. Write the problem in its entirety on the page or computer screen.

2. Write each subproblem in its entirety as well.

3. Identify the important words and phrases in each subproblem.

4. Translate these words and phrases into specific topics you must learn more about. These topics become your "agenda" as you read the literature.

5. Go to the library catalog, its online databases, and the Internet to seek out resources related to your agenda.

Let's take an example. For his dissertation research, doctoral student Arthur Benton wanted to develop a means of using an existing measurement instrument, the Strong Vocational Interest Blank (SVIB), to identify potential cartographers for the federal government. The SVIB assesses a person's interests in a wide variety of activities; the profile of interests that it generates is then compared with the interests of people in various occupations to identify career paths in which the person might find satisfaction and success. At the time the study was conducted, interest scales for 54 different occupational groups had been developed for the SVIB, but none had been developed for cartographers. The SVIB was published in two versions, the SVIB for Men and the SVIB for Women; to limit the scope of the project, Mr. Benton focused only on the SVIB for Men. In his dissertation proposal, he presented the following research problem:

> This researcher proposes to identify and evaluate the existing discrete interests among Federally employed male cartographers and to develop a scale for the revised Strong Vocational Interest Blank to aid recruitment of cartographers into Federal employment.

He then divided his problem into three subproblems:

> The first subproblem is to determine whether male cartographers employed by the Federal Government have a discrete pattern of interests different from those of men in general, as measured by the Strong Vocational Interest Blank for Men.

> The second subproblem is to construct a scoring key for the Strong Vocational Interest Blank to differentiate the interests of cartographers from those of men in general and also from the interests of other occupational groups.

> The third subproblem is to analyze and interpret the treated data so as to evaluate the discovered interests in terms of their discreteness in recruiting cartographers.

Figure 3.1 shows the literature-review agenda we created for the research problem and three subproblems using an early version of Inspiration mind mapping software. The four rectangles

FIGURE 3.1 ■ Using Mind Mapping Software to Prepare for a Review of the Literature
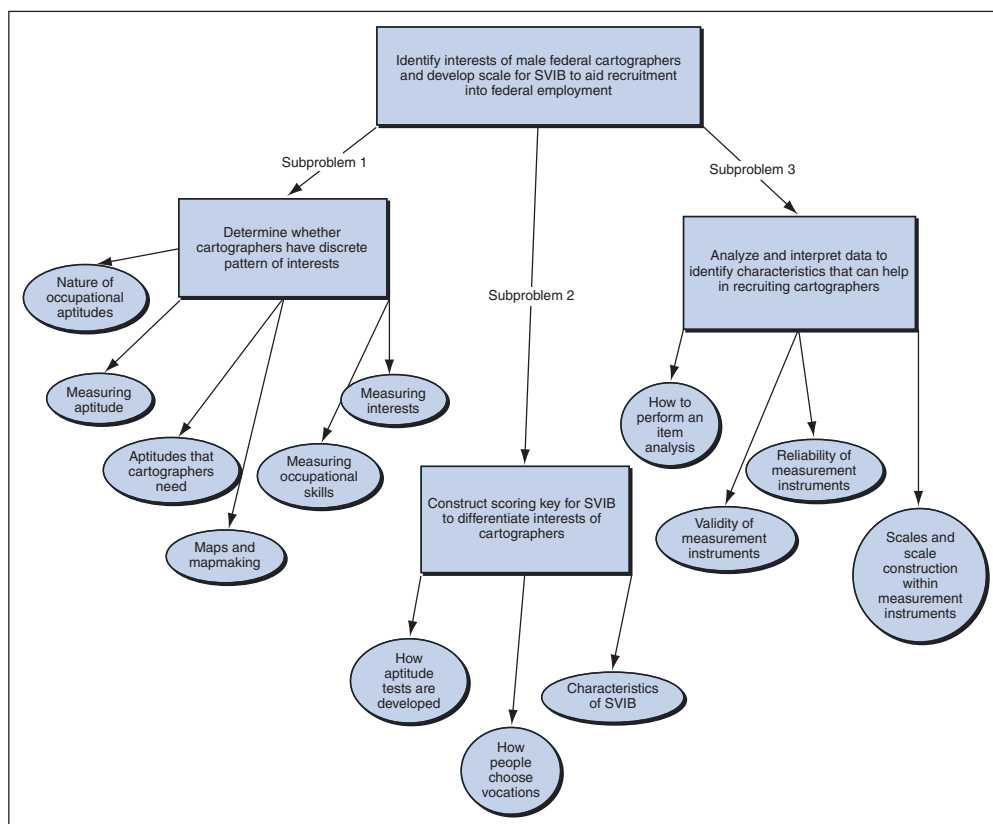
represent the research problem and its three subproblems. The ovals reflect the specific things we need to learn more about with respect to each subproblem.

The sequence of steps just described can help you keep your literature review within the realm of your research problem. It prevents you from wandering into other areas of the literature that, though potentially quite intriguing, may be of little or no use to you when the time comes to write your literature review.

Now that you have an idea of what to search for, let's consider how to make your search efforts efficient and productive.

GUIDELINES   Using Your Library Time Efficiently

Make no mistake about it: Conducting a thorough literature review takes a great deal of time. And almost certainly you will *not* be able to conduct your entire literature review from your home computer. So plan on going to the library—*not just once but several times,* especially as your analysis of the literature points you in potentially fruitful new directions. Following are suggestions for maximizing your efficiency at the library.

USING TECHNOLOGY

1. ***Before you go to the library, create a computer database for the resources you are going to gather.***   Earlier we spoke of the databases available through online searches. In fact, you can create your *own* database for the literature you read. One possibility is to use spreadsheet software to keep track of potentially useful literature sources (see Appendix A). Alternatively, you might use software specifically designed for creating bibliographic databases. Some are available commercially; examples are Biblioscape, EndNote, OneNote, and RefWorks. By searching the Internet, you can also find and download "freeware" (free software) that will serve your purpose; as this book goes to press, examples are BiblioExpress, ReadCube, and Zotero.

Bibliographic software programs typically have designated places, or *fields,* for all the information you would need in order to create a reference list—such as author, title, date, journal title and page numbers (for articles), and publishing company and location (for books). These programs can also *create your reference list for you!* Most programs allow you to use whatever format your institution or academic discipline requires (e.g., APA style or MLA style; see Chapter 13 for details). Furthermore, these programs have additional fields for call numbers, keywords, any notes you take while reading an item, and (often) any graphics you want to include. And some of them let you incorporate full texts of certain sources, especially journal articles, conference papers, and other documents in pdf form. If you decide to use a bibliographic software program, you might want to watch one or more of its online video tutorials to learn how to use its many features.

By putting the information you collect in an electronic database, you can later find anything you want in a matter of seconds. For example, perhaps you want to find books and articles written by a specific author. You can search the author field in the entire database; the program will identify every record for that author. In addition, you can rapidly sort the data by whatever field you choose. For example, if you want all of your sources listed by publication date, the program will, with appropriate instructions, rearrange them in chronological order.

2. ***Go to the library armed with data-gathering tools.***   If you have taken our advice in Step 1, you should, of course, bring a laptop with your database set up and ready to go. If, instead, you decide to go a low-tech, paper-and-pencil route, you should have some systematic way of recording the information you collect—ideally one that will also allow you to easily organize it. A paper-and-pencil approach involves taking note paper or index cards on which to write what you find—not only information relevant to your topic but also information about the sources in which you find it: titles, authors, journal titles (if applicable), publication dates, and so on. Some people going the paper-and-pencil route have found it helpful to print up a large number of note-taking forms similar to that shown in Figure 3.2.

3. ***Identify the materials you want to read (books, articles, etc.), and determine whether your library has them.***   You will probably identify many of the sources you need by consulting

Call No./Database _____

Author(s) _____ Date _____

Title of book or article _____

Journal title, volume/issue, pages _____

_____

Place of publication, publisher, date, edition (for books)

_____

Comments (use space below and reverse side)

the library catalog and perusing indexes and abstracts in online databases. As you make a list of your desired sources, keep the following suggestions in mind:

- *Keep track of the specific searches you conduct.*   For example, make lists of which indexes and other databases you consult, as well as which keywords you use and in what order. Keeping such records ensures that you won't duplicate your efforts.
- *Let computers make your lists for you whenever possible.*   For instance, if you are using one of your library's online databases, you will probably be able to print out the sources you identify or, if you prefer, e-mail your list (and in some cases actual journal articles) to yourself. And if you are using a bibliographic software program to organize your literature, you may be able to *import* all the bibliographic information for a particular source from a library database directly into your own database.
- *Check the library holdings for the books and journals you identify.*   More specifically, make note of whether the library owns the sources you need and, if so, where they are located and whether they are currently on loan to another user. In the case of journals, you should also check to see whether they are in paper, online, or on microform (e.g., microfilm, microfiche). If the library does *not* have something you need, keep the reference; we will talk about alternative strategies for obtaining such materials shortly.

4. ***Develop an organized plan of attack for finding the sources you have identified.*** Arrange any paper and microform sources you need to obtain according to where they are located in the library. For instance, you can organize books by call number. You can organize journal articles first by paper versus microform, and then by the specific journals in which the articles appear. If your university has two or more separate libraries, you will also want to organize your sources by the specific buildings in which they are located.

5. ***Track down your sources.***   After you have organized your sources, you're ready to go find them and look them over. Keep a record of whether each item was (a) found and used, (b) found but determined not to be helpful, or (c) not found. As you peruse the stacks, don't forget to browse neighboring shelves.

6. ***Record all basic information as you read each source.***   "Make haste slowly" is a sound rule for any researcher. Be careful not to make careless, half-complete notes that—when you read them later—are either unintelligible or so lacking in essential information that they're practically useless. If you are using paper to record your findings, write legibly or print clearly. If you can't distinguish between undotted *i*'s and closed-up *e*'s, or between carelessly made *a*'s and *o*'s, you may eventually find yourself scurrying back to sources for such details.

In addition to recording any essential bibliographic information you haven't previously obtained, you will want to take sufficient notes about the content of the source to enable you to recreate its ideas when you are writing your literature review. As you do so, you may find it helpful to keep track of the pages on which you have found certain ideas; furthermore, page numbers are essential if you are quoting a source word for word. Also, put quotation marks around word-for-word transcriptions of phrases or sentences in a source. Later, the quotation marks can remind you that these are *someone else's words*—not yours—and must be identified as such in your literature review (more on this point in an upcoming discussion of plagiarism). In some cases, of course, a source will have so much information that you will simply want to make a photocopy of relevant pages[1] or, in the case of a book, check it out and take it home.

7. ***Identify strategies for obtaining sources that are not immediately available.*** We can almost guarantee that you won't find everything you need the first time around. Some books may be currently checked out to other users. Other books and a few journals may not be among the library's holdings. Following are several strategies to consider in such situations:

- ***Put a hold on a checked-out book.*** If you discover that a book has been checked out but is due to be returned shortly, your university catalog system will probably let you put a *hold* on the book so that you are the next one in line to check it out when it comes in. If your system doesn't provide this option, ask the librarian at the circulation desk to put a hold on the book for you. The library will contact you (typically by e-mail) as soon as the book is returned and save it for you for a few days at the circulation desk.
- ***Recall the book.*** Many university libraries allow professors to check out books for an entire semester or academic year, but the professors must return them earlier if someone else wants to use them. If you discover that a book you need is checked out for a long period of time—maybe for several months or longer—you can ask for the book to be *recalled* so that you can have access to it. Some university catalog systems let you recall a book yourself; for example, if you see a "request" button on the catalog page for the book, clicking on it will probably initiate a recall notice to the person who currently has it.
- ***Submit a request for the source through interlibrary loan.*** Almost all libraries have cooperative arrangements to exchange resources with other libraries. In all likelihood, you will be able to order a book or journal article through such **interlibrary loan** using your library's catalog system. A "low-tech" alternative is to make the request through your library's interlibrary loan office. Typically you can get books and journal articles from other libraries at little or no charge except, perhaps, for photocopying.
- ***Check Google Books for older, out-of-print books.*** Some books available on Google Books are no longer protected by copyright and are typically available free of charge. Those still under copyright are available only to the extent that the copyright holders have given permission; in such cases, you may be able to view excerpts from the book but may need to pay a small fee to see the entire book.
- ***Order books from a bookstore.*** Most bookstores will order any book that is currently in print and obtain it for you within a week or two. You can also order both new and used books through such online booksellers as Amazon (amazon.com) and Barnes & Noble (barnesandnoble.com).
- ***Use an online document delivery service.*** Some of the online databases listed in Table 3.2 (e.g., Academic Search Premier, JSTOR, PsycINFO) provide electronic copies of articles from selected journals. Others (e.g., ERIC) provide electronic copies of conference papers and other nonpublished works. If you find one or more doctoral dissertations that pertain directly to your research problem, you can order complete copies through ProQuest Dissertations and Theses: Full Text (proquest.com). Some of these services may be available to you free of charge through your university library; others may charge you a fee.

---

[1]In the United States, federal copyright law allows one copy for personal use.

As you conduct your literature review, you will undoubtedly need to repeat this cycle of steps several times. With each go-around, however, you will become more and more of an expert about the topic you are pursuing. You will also become increasingly knowledgeable about the library and its resources.

PRACTICAL APPLICATION Evaluating the Research of Others

An important skill for any researcher is the ability to review the work of others and evaluate the quality of their methods, results, and conclusions. *Never take other people's conclusions at face value; determine for yourself whether their conclusions are justified based on the data presented.* Critically examining what others have done has three distinct benefits:

- It can help you determine which ideas, research findings, and conclusions you should take seriously and which you can reasonably discredit or ignore.
- It can help you reconcile inconsistent findings obtained in previous research studies.
- It can give you some ideas about how you might improve your own research efforts.

As you proceed through the rest of this book and learn more about research methodology, you will become increasingly knowledgeable about the kinds of conclusions that are and are not warranted from various methodologies and types of data. At this point, you may be able to judge the work of other researchers only in a fairly superficial fashion. Even so, there's no better time than the present to begin examining other researchers' work with a critical eye. We suggest that you begin to sharpen your evaluation skills by locating several research articles relevant to your interests. As you read and study the articles, consider the questions in the following checklist.

✔ CHECKLIST

Evaluating a Research Article

_____ 1. In what journal or other source did you find the article? Was it reviewed by experts in the field before it was published? That is, was the article in a *juried* (refereed) publication?

     _____

     _____

_____ 2. Does the article have a stated research question or problem? That is, can you determine the focus of the author's work?

     _____

     _____

_____ 3. Does the article describe the collection of new data, or does it describe and synthesize previous studies in which data were collected?

     _____

     _____

_____ 4. Is the article logically organized and easy to follow? What could have been done to improve its organization and readability?

     _____

     _____

_____   5. Does the article contain a section that describes and integrates previous studies on this topic? In what ways is this previous work relevant to the research problem?

_____

_____

_____   6. If the author explained procedures that were followed in the study, are these procedures clear enough that you could repeat the work and get similar results? What additional information might be helpful or essential for you to replicate the study?

_____

_____

_____   7. If data were collected, can you describe how they were collected and how they were analyzed? Do you agree with what was done? If you had been the researcher, what additional things might you have done?

_____

_____

_____

_____   8. Do you agree with the author's interpretations and conclusions? Why or why not?

_____

_____

_____   9. Finally, think about the entire article. What is, for you, most important? What do you find most interesting? What do you think are the strengths and weaknesses of this article? Will you remember this article in the future? Why or why not?

_____

_____

_____

KNOWING WHEN TO QUIT

Certainly you shouldn't read only one or two articles and think that you're done. Get used to looking for and reading new research reports; for a researcher, this is a lifelong endeavor. There are always, _always_ new things to learn about a topic.

At some point, however, you must be practical and bring your preliminary literature review to a close. How will you know when that time has arrived? The best advice we can give you is this: _Look for repetitive patterns in the materials you are finding and reading._ As you read more and more sources, eventually familiar arguments, methodologies, and findings will start to appear. Perhaps you will see the same key people and studies cited over and over. You will get a feeling of _déjà vu_—"I've seen this (or something very similar to it) before." When you are no longer encountering new viewpoints, you can be reasonably sure that you are familiar with the critical parts of the literature.

Notice our use of the adjective _preliminary_ to modify "literature review" in the second paragraph of this section. As you begin to write your review of the literature, you may find certain gaps in your knowledge that need filling. And later on, after you've collected your data, you may find intriguing results within them that additional explorations of related literature might help you sensibly interpret. Thus, you should plan on spending some additional time in your university library or its online equivalent as your project proceeds.