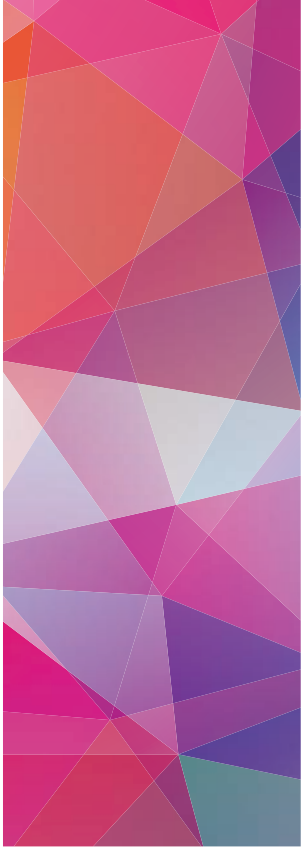
chapter 3



Reviewing the Literature

LEARNING OBJECTIVES

After studying this chapter, you will be able to:

- **3-1** Describe the role of related literature in quantitative research, and identify the main functions of a literature review in quantitative research.
- **3-2** Describe the role of related literature in qualitative and mixed methods research.
- **3-3** Describe and use resources to efficiently locate related literature.
- **3-4** Understand the key reasons for the importance of mastering online database searching.
- **3-5** Understand the criteria for judging the merit of information on the Internet.
- **3-6** Detail a systematic progression of steps in organizing the literature, and explain the purpose of each step.

If I have seen further it is by standing on the shoulders of giants.

Sir Isaac Newton (1642–1727)

The search for related literature plays a fundamental but different role in qualitative and quantitative research. It must be completed early in quantitative research but not in qualitative research.

Photo above by Marlene Somsak

3-1 The Role of Related Literature in Quantitative Research

related literature Literature (studies, theories) connected to the topic under investigation.

Quantitative researchers are urged not to rush headlong into conducting their study. The search for **related literature** should be completed before the study commences to provide a context and background that supports the conduct of the study. This literature review stage serves several important functions:

1. *Knowledge of related research enables investigators to define the frontiers of their field.* To use an analogy, an explorer might say, "We know that beyond this river there are plains for 2,000 miles west, and beyond those plains a range of mountains, but we do not know what lies beyond the mountains. I propose to cross the plains, go over the mountains, and proceed from there in a westerly direction." Likewise, the researcher in a sense says, "The work of A, B, and C has discovered this much about my question; the investigations of D have added this much to our knowledge. I propose to go beyond D's work in the following manner."
2. *A thorough review of related theory and research enables researchers to place their questions in perspective*. You should determine whether your endeavors are likely to add to knowledge in a meaningful way. Knowledge in any given area consists of the accumulated outcomes of numerous studies that generations of researchers have conducted and of the theories designed to integrate this knowledge and explain the observed phenomena. You should review the literature to find links between your study and the accumulated knowledge in your field of interest. Studies with no link to the existing knowledge seldom make significant contributions to the field. Such studies tend to produce isolated bits of information that are of limited usefulness.
3. *Reviewing related literature helps researchers limit their research question and clarify and define the concepts of the study.* A research question may be too broad to be carried out or too vague to be put into concrete operation; for example, "What do parenting practices have to do with mental health?" A careful review of the literature can help researchers revise their initial questions so that the final questions can be investigated. The literature review also helps to clarify the constructs involved in the study and translate these constructs into operational definitions. Many educational and behavioral constructs—such as stress, creativity, frustration, aggression, achievement, motivation, and adjustment—need to be clarified and operationally defined. These, as well as many other educational and behavioral constructs, do not lend themselves to research until they can be quantified. In reviewing literature, you become familiar with previous efforts to clarify and operationally define these constructs. Successful reviews often result in the formation of hypotheses regarding the relationships among variables in a study. The hypotheses can provide direction and focus for the study.
4. *Through studying related research, investigators learn which methodologies have proven useful and which seem less promising*. The investigator develops increasing sophistication after digging through the layers of research that the related literature represents. As you delve into your topic, you soon see that the quality of research varies greatly. Eventually, you should notice that not all studies in any one field are necessarily equal. You will soon be critiquing studies and noticing ways of improving them. For example, early studies in any one particular field may seem crude and ineffective because research methodology and design are constantly refined with each new study. Even so, many research projects fail because they use inappropriate procedures, instruments, research designs, or statistical analyses. Becoming proficient at evaluating research to determine its worth helps the investigator discover the most useful research path.

5. *A thorough search through related research avoids unintentional replication of previous studies*. Frequently, a researcher develops a worthwhile idea only to discover that a very similar study has already been made. In such a case, the researcher must decide whether to deliberately replicate the previous work or to investigate a different aspect of the problem. Duplication of previous research is usually conducted to test previous findings with new subject populations and thus confirm or invalidate it.
6. *The study of related literature places researchers in a better position to interpret the significance of their own results*. Becoming familiar with theory in the field and with previous research prepares researchers for fitting their research findings into the body of knowledge in the field.

As this discussion shows, quantitative research is built on a study of earlier work in the field, which helps the researcher refine his or her problem and place it in context. For qualitative researchers, the approach is very different. They are advised not to read in their area of interest because it is important that they approach their study without any preconceived ideas that might influence their work.

3-2 The Role of Related Literature in Qualitative and Mixed Methods Research

Barney G. Glaser, a pioneer in the grounded theory school within qualitative research, wrote, "In our approach we collect the data first. Then start analyzing it and generating theory. When the theory seems sufficiently grounded and developed, then we review the literature in the field and relate the theory to it through integration of ideas" (1978, p. 31). Glaser added, "It is vital to read but in a substantive field different from the research. This maximizes the avoidance of pre-empting, preconceived concepts" (ibid.). This approach is frequently applied to qualitative studies in the social sciences, such as education, and is distinctly different from the traditional scientific method. Grounded theory is developed inductively after examining a body of data and the resulting theory seeks to fit the data, whereas traditional grand theory is deductive and may not fit the data collected.

A grounded theory-oriented researcher may find a search for research with his descriptors in fields such as medicine or animal behavior useful. The grounded theory researcher would not seek related literature in any of the human behavioral sciences.

When the grounded theory study is complete, the researcher formulates theories to explain what has been observed. Then the researcher searches the literature to determine how his or her conclusions fit into the existing theories in the field.

Other fields of qualitative research may include a brief review of related literature at the beginning of a study to identify the theory that inspired the research or to justify the need for it. In the case of mixed methods research, the literature review may take a more dynamic and flexible form. It may be exploratory in the beginning stages of the study and explanatory at the end of the study. Or, it may take on both characteristics in iterative fashion as new research questions arise.

3-3 Efficient Location of Related Literature

descriptors Keywords used in computer searching of databases. Usually part of a controlled vocabulary, accessible by using a thesaurus specific to that database.

In the past, and sometimes still today, researchers visit libraries to search manually for information related to their research topic. Doing a manual search requires that you first decide what keywords, or **descriptors**, best fit your topic, and then look at periodical indexes that are provided on the reference shelves in the library in order to find references to periodicals that most likely include your area of interest. Make sure that

you note all relevant bibliographic details for those references—author, title, journal name, data, volume number, and pages.

However, manual searching is time-consuming and inefficient. Presently, most universities, colleges, and public and private libraries subscribe to indexing and abstracting databases that are electronically searchable.

Boolean logic Named after the 19th-century mathematician George Boole, a search allowing the inclusion or exclusion of documents through the use of Boolean operators AND, NOT, and OR.

The software in the electronic library databases can search for many topics simultaneously and combine them, using logical concepts known as **Boolean logic** (from the logic system developed by the 19th-century English mathematician George Boole). The essence of Boolean logic lies in the use of three terms—*AND*, *OR*, and *NOT*—which are used to tell the computer's search engine how the investigator wants it to deal with the various constructs relevant to the study. For example, if you are interested in the outcome of different methods of teaching English spelling to early primary students, you would start by finding all appropriate descriptors for English spelling instruction and for primary grades. If you connect these with AND, you will only get documents that have both descriptors, thus narrowing your search. The more terms or concepts you add to your search using AND, the fewer results you will retrieve. If you use OR instead, you will broaden your search and get a flood of information about English spelling instruction in all grades, together with a second flood about primary grades not necessarily confined to the teaching of English spelling. The more terms or concepts you add to your search using OR, the more results you will retrieve. So as not to drown in excessive and possibly irrelevant information, you can narrow your search by adding descriptors to either side of your OR equation. Thus, think of OR as an inclusive or broadening operation and AND as a selective or narrowing operation. The third option, NOT, is also an exclusive or narrowing operation. If you wished your search to be focused on American English spelling instruction only, you might want to add NOT British. Thus, your search string would read English Spelling Instruction AND Primary Grades NOT British. In practice, it is likely that you will have more descriptors, and you will have to think carefully whether they should be linked with AND, OR, or NOT.

The circles in Figure 3.1 show the use of Boolean logic in its simplest form, with only two constructs. The circles on the left show the use of AND, which includes both construct A and construct B. The circles in the center show the use of OR, which include all the documents with either construct A or construct B. The circles on the right include documents with construct A but not construct B. Keep in mind that while most search engines today use Boolean logic, some may not. Be sure to consult the help or FAQ sections of each database you use to make sure it uses Boolean operators.

Here is an example of a search in the field of education using the ERIC database (see next section; www.eric.ed.gov). Using the Boolean descriptors (from the ERIC Thesaurus) "Changing answers" OR "Answer changing" AND "Multiple choice tests," plus a request for articles since 2004, turned up five articles dealing with the effect of changing answers in multiple-choice tests. In every study, more changes were from wrong to right, as had been the case in all the previous studies.

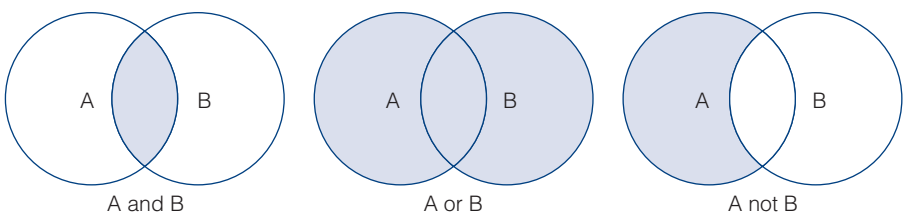


Figure 3.1 Shaded Areas Represent What Is Retrieved by Each Logical Statement

3-3a Indexing and Abstracting Databases

indexing and abstracting periodicals Compilation of professional journals by discipline or other topic area with searching via key terms.

Indexing and abstracting periodicals are vital for locating relevant sources in your field. Database companies gather professional journals in each discipline. Their staff identifies the key terms for each article, indexes them, and typically provides an abstract for each article.

Databases that combine several indexing and abstracting products are very useful, because you can input your key terms of interest and the database will identify relevant journal articles by journal, date, volume number, and page number.

ERIC (Educational Resources Information Center)

ERIC database Education Resources Information Clearinghouse.

There are several reasons for beginning with the **ERIC database**:

1. ERIC indexes and abstracts more education-related primary sources than any other database. It covers more than 1,900 journals and more than 1.6 million documents.
2. It includes useful primary sources that were never published. In fact, ERIC was established in 1966 to collect, store, index, and abstract unpublished (fugitive) information. Such documents include reports submitted to the U.S. Department of Education by its contractors and grantees, reports submitted to state and local departments of education, papers presented at professional conferences, and so forth. The ID numbers of these documents begin with ED. Only later were professional journals added to the ERIC database. The ID numbers of journal articles begin with EJ. You can download the full text of ED materials. With EJ articles, you are able to download only key terms (which ERIC calls descriptors) and abstracts, not the full text.
3. It can be accessed for free from any computer via www.eric.ed.gov. The U.S. Department of Education contracts with a private contractor to maintain the ERIC system and provide its services free to the public.

The ERIC system formerly produced hard copy (print) periodicals of ED materials in *Resources in Education* and EJ documents in *Current Index to Journals in Education*. Today it exists only in electronic form. Submissions to ERIC are now vetted according to six criteria:

1. Relevance of the submission to education
2. Quality of the submission (completeness, integrity, substantive merit, utility/importance, and education research)
3. Sponsorship by professional societies or organizations, and government agencies
4. Editorial and peer review criteria
5. Availability in English
6. Availability in electronic format

Using the ERIC System

As a general rule, the following steps are components of a successful ERIC search:

1. Determine the keywords (descriptors) under which articles relevant to your study might be listed. These keywords will typically include the population and the variables you have identified in your problem statement.
2. Because the ERIC system only recognizes descriptors from its own thesaurus, you will need to find which of your keywords are used as descriptors. You may need to find synonyms for some of your keywords.
3. Using ERIC descriptors and Boolean logic, perform the search, and copy or save the entire reference given for any title that may be useful. This procedure simplifies the task of finding the original articles.

4. Read the abstract first. If the abstract leads you to believe the entire document would be of interest, you can download the entire document if it has an ED prefix. If it is an EJ article, first try to download the full text through a different database. If that fails, seek out a print version of the article at your library.
5. Search out articles in their journals at your own institution or through an interlibrary loan, or ask a librarian about the possibility of obtaining the articles online either through your library or through other commercial sources.

A search of the ERIC system is an important step in the quest for related literature, but the researcher cannot assume that when this step is finished, the quest is completed. Material relevant to your question may not have been included in the ERIC database.

Most other databases charge for their services. Fortunately, most universities, colleges, and some public libraries subscribe to at least some databases and make them available to their clients and, in many cases, to anyone via the libraries' on-site terminals. Check with your library to determine what databases you can access through its services. This often varies according to licensing agreements with the database vendors and as libraries' budgets wax and wane.

3-3b Other Education-Focused Periodical Indexes

Many other periodical indexes in the field of education are useful for locating up-to-date information on research as well as contemporary opinion in the field. One of the standard indexes in the field is *Education Index Retrospective.* Published regularly since 1929, this index includes articles in 800 periodicals, yearbooks, bulletins, proceedings, and monographic series. ERIC does not index 118 of these 800 periodicals. *Education Index Retrospective* is one of the best sources for locating journal articles published prior to the establishment of ERIC. A disadvantage of *Education Index Retrospective* is that it does not include abstracts.

EBSCO Information Services, the publisher of *Education Index Retrospective*, has produced two additional electronic databases, *Education Abstracts* and *Education Full Text*. *Education Abstracts* comprises indexing and abstracts for more than 1,000 periodicals and yearbooks, with indexing dating back to 1969 and abstracts back to 1997. Books on education published after 1983 are also indexed within the *Education Abstracts* database. The *Education Full Text* database provides full-text coverage of journal articles dating back to 1983 and indexing dating back to 1969. *Education Full Text* also features in-depth coverage of special education, with 30 full-text journals dedicated to this important topic. *Education Full Text* includes approximately 520 journals considered the most important in the field and indexes more than 1,000 journals, including those from *Education Index Retrospective.*

Exceptional Child Education Resources (ECER) is a quarterly publication that contains abstracts of resources in exceptional child education. It uses the same thesaurus of descriptors, indexing, and abstracting rules that ERIC does, and there is considerable overlap of resources indexed by ERIC and ECER.

The *Physical Education Index* provides a comprehensive database of all aspects of physical education.

Child Development Abstracts and Bibliography, published annually from 1927 to 2001, provides an author and subject approach to the areas of infancy; clinical medicine and public health; counseling; and developmental, comparative, and experimental psychology. *Educational Administration Abstracts* provides an author and subject approach to specialized journals in the field of educational administration. *Higher Education Abstracts* is a compilation of abstracts from journals, conference proceedings, and research reports relating to college students and student services. Topics covered include counseling and housing, financial aid, and testing and measurement.

EBSCO Information Services is a major player in the field of electronic databases, particularly in the field of education. Its primary database platform, EBSCOhost, provides the online product *Child Development and Adolescent Studies*, which includes 417,000 records with references to current and historical literature related to the education and development of children up to the age of 21. It includes every issue, from 1927 to 2001, of *Child Development Abstracts and Bibliography* (formerly published by the Society for Research in Child Development). Recent coverage on current topics in education is also included. EBSCOhost also provides access to the *Teacher Reference Center*, which contains indexing and abstracting for 220 teacher and administrator journals and magazines. EBSCO also produces *Education Source*, which covers all levels of education and education specialties, the full text for more than 2,000 journals, and nearly four million citations—from early childhood to higher education as well as all educational specialties such as multilingual education, health education, and academic testing.

There are specialized indexes for every discipline, including business education, industrial arts, and medicine. Some are available electronically and some in print; many are available in both formats. The availability of either format depends on several factors, including the library you use and its patrons' needs, the quality of the electronic version of the index, and cost, to name a few. By consulting the basic guides to the literature, your library's website or a librarian, you can obtain the names of the specialized indexes in other fields that you may need.

3-3c Other Useful Databases

PsycINFO is a database covering nearly 2,500 journals in addition to books and book chapters. It is second only to ERIC in its usefulness to researchers in education. The material covered in this database is related to psychology, education, business, economics, linguistics, social work, health care, and many other fields. *PsycARTICLES*, a subset of *PsycINFO*, offers full text for some of the journals referenced through *PsycINFO*. Information about these databases is available at the American Psychological Association's website. Most university libraries subscribe to the *PsycINFO* service.

The procedure for using *PsycINFO* is the same as for ERIC, but you must use *PsycINFO*'s thesaurus.

3-3d Citation Indexes

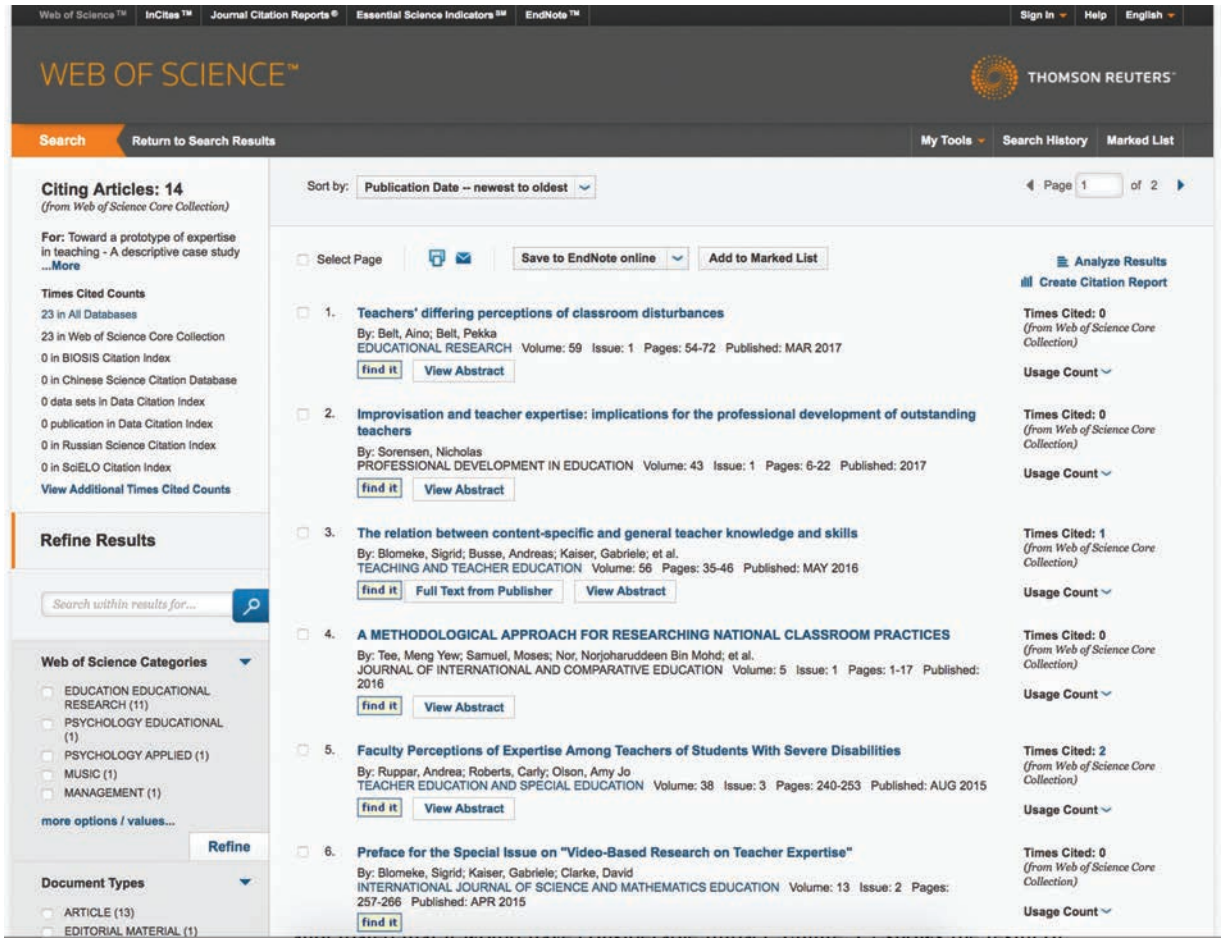
Having access to print copies of *Social Sciences Citation Index* (*SSCI*) (published since 1973), the *Science Citation Index* (*SCI*) (published since 1955), and the *Arts and Humanities Citation Index* (*A&HCI*) (published since 1976) is somewhat akin to having access to a time machine. If you have read a particularly useful article that was published in 1996, you can use subsequent annual indexes to identify more recent publications that cite the 1996 article and list it as a reference, or you can find out which earlier writers were cited by its author. Clarivate subscribes to every major journal in each of its three general areas. For example, *SSCI* currently receives more than 3,200 journals to produce its annual index. We use *SSCI* in our description here because most education literature is referenced in that index.

SSCI identifies which authors have been cited during the year in all areas of social science, including education, and what has been written in various areas. It also includes the necessary bibliographic information for both cited and citing authors. This information is made available by way of four indexes:

1. The *Source Index* is an alphabetical list of all authors published in the journals covered by *SSCI* during the year. Complete bibliographic information is provided for the articles published by these authors, followed by an alphabetical list of the first

authors of each source cited in each article. The *Source Index* is cross-referenced to secondary authors. This index identifies papers cited by the authors listed, enabling you to search backwards in time. Some authors will have several articles in the same year. If you are interested in the work of a particular author, the *Source Index* is the place to go.

2. The *Citation Index* presents an alphabetic list of the first authors of all works cited in the articles included in the *Source Index*, followed by the year, journal title, volume, and first page for each of that author's cited articles. For each article, the *Citation Index* lists the names of other authors who cited that article, followed by the journal, volume, first page, and year of the article in which the citation occurred. Thus, the *Citation Index* lets you follow the work of a particular author forward in time. For example, in the seventh edition of this book published in 2005, we included the entire article "Toward a Prototype of Expertise in Teaching: A Descriptive Case Study," by Tracy W. Smith and David Straham (2004) in the *Journal of Teacher Education*, 55(4), 357–372. The dissertation upon which this article was based won the American Association of Colleges of Teacher Education 2001 Outstanding Dissertation Award. We anticipated that it would have considerable impact. Figure 3.2 shows the result of our search through the citation section of the *SSCI* subdivision of the *Web of Science*.
3. The *Permuterm Subject Index* takes every significant word and pairs it with every other significant word in each title. Each word in a title is then listed as a primary term combined with each of the other terms as co-terms. An alphabetic listing of the names of authors whose titles contain the words is provided for each paired



Source: Reuters

Figure 3.2 Example of *SSCI* Citation Entry (from 2017)

primary term and co-term. You can thus use the *Source Index* to find bibliographic information for each author.

4. Bound in with the *Permuterm Subject Index*, the *Corporate Address Index* is an alphabetical listing of organizations with which authors publishing during the year are affiliated. Under each corporate entry is a list of authors with complete bibliographic information.

SSCI is available in both print and online formats. Due to the cost of this massive resource, some libraries have neither. However, *SSCI*, *SCI*, and *A&HCI* can be accessed through the electronic **aggregate database** *Web of Science*. Many large academic libraries subscribe to *Web of Science*. After determining what indexes or databases you need, consult with your librarian on the library resources available to access them.

aggregate databases
Large databases that combine single-topic databases.

Tests in Print and *Mental Measurements Yearbook*

Tests in Print, produced by the Buros Center for Testing at the University of Nebraska, does the same for commercially available tests. If you find a test that interests you in *Tests in Print*, you will be referred to the appropriate volume of *Mental Measurements Yearbook* (*MMY*) (also published by the Buros Center) for more information on the test (e.g., test purpose, test publisher, price, test acronym, intended test population, administration times, publication date(s), test authors, and in-print status). Descriptions of each test are followed by critical reviews and references to studies in which the test has been used.

Tests in Print and *MMY* are both in hard copy and electronic form. A useful strategy is to first determine if your chosen test is in *Tests Reviews Online*, which is continuously updated. Then seek the detail in the *MMY* hard copy at your library.

If your library has neither the hard copy nor the electronic *MMY*, try getting it through interlibrary loan or other sources. If you are in a hurry, *Test Reviews Online* will send you the reviews for a $15 fee.

If you cannot find the test you want in *Test Reviews Online*, the Buros Center recommends searching the Educational Testing Service (ETS) website. ETS maintains information on more than 25,000 commercial and research instruments, although it does not provide evaluations.

3-3e Statistical Sources

For educational statistics, the federal government, followed by states and local governments, accounts for the greatest number of statistical documents. The National Center for Education Statistics (NCES) website (https://nces.ed.gov) serves the research, education, and other interested communities. NCES fulfills a congressional mandate to collect, collate, analyze, and report complete statistics on the condition of American education; conduct and publish reports; and review and report on education activities internationally. See the Fast Facts, QuickTables, Common Core, and Surveys and Programs pages to get started.

Several other commonly known reference works—such as *World Almanac and Book of Facts* and *Information Please Almanac*—contain statistics from educational fields and other subjects. In general, the data are reliable, and sources for many of the statistics are also given.

Three indexes to statistics previously published by the Washington-based Congressional Information Service and now available via ProQuest are the *American Statistics Index* (*ASI*), *Statistical Reference Index* (*SRI*), and *Index to International Statistics* (*IIS*). The *ASI* indexes and abstracts almost every statistical source issued by the federal government. The *SRI* indexes and abstracts state documents and also includes many nongovernmental statistics, ranging from those issued by private concerns and businesses

to those issued by nonprofit organizations and associations. The *IIS* includes major governmental statistics from throughout the world. It is an excellent source of United Nations statistical data. These three indexes are available through the ProQuest Statistical Insight collection.

Since 1962, the *Digest of Education Statistics* has covered the broad field of U.S. education from kindergarten through graduate school. This publication includes a selection of data from many sources, both government and private, and draws heavily on the results of surveys and activities carried out by the NCES. As noted previously, the full text of the digest and other important statistical publications are searchable through the NCES website (https://nces.ed.gov).

3-3f Government Publications

The federal government, a major source of education information, sponsors more research, conducts more surveys, and collects more statistics of all kinds than any other organization in the United States. The U.S. Department of Education disseminates a vast number of publications, including research reports, surveys, administrative actions, and program descriptions.

For locating specific U.S. government publications, the U.S. Superintendent of Documents' *Catalog of U.S. Government Publications* (*CGP*, published only online by the U.S. Government Printing Office [GPO]) is the prime index to consult. Its main section lists documents published by each agency, and it also includes title, author, subject, and title–keyword indexes. Publications from 1975 or earlier are available in print only in the form of the *Monthly Catalog of the U.S. Government Publications*. Publications from 1976 onward are available online through the *CGP*.

You can locate publications of state departments of education and other state agencies through the home pages of each state's department of education. As is true of nearly all indexes useful to scholars, most government indexes are now available online. The gateways for government information and publications on education are the U.S. Department of Education website at www.ed.gov, and the NCES website at https://nces.ed.gov. At these websites you can find links to reports on current research, policy papers, and the searchable text of past and current popular paper resources, such as the *Digest of Education Statistics*, *Projections of Education Statistics*, and the *Condition of Education*.

The purpose of the *Digest* is to provide a compilation of statistical information covering the broad field of U.S. education from kindergarten through graduate school. The 2015 *Digest* includes 626 tables from many different data sources.

Projections of Education Statistics to 2024 provides projections for key education statistics. It includes statistics on enrollment, graduates, classroom teachers, and expenditures in elementary and secondary schools and in institutions of higher education. The tables, figures, and text contain data on enrollment, teachers, graduates, and expenditures for the past 14 years and projections to the year 2024.

The *Condition of Education* describes the current status and recent progress of education in the United States. The 2017 online compendium features an overview essay and 50 key indicators on the status and condition of education and are grouped under four main areas: (1) population characteristics, (2) participation in education, (3) elementary and secondary education, and (4) postsecondary education.

3-3g Dissertations and Theses Global (Formerly ProQuest Digital Dissertations)

This database includes abstracts of doctoral dissertations and master's theses dating back to 1861. A wealth of information from more than 4 million dissertations and

theses completed at more than 1,000 accredited colleges and universities worldwide can be found through this source. Over 2 million dissertations and theses dating back to 1997 are digitized and available for PDF download. Print copies are available for those items not yet digitized. The database can be searched by keyword, title, and author. Its hard copy form is *Dissertation Abstracts*.

3-3h Aggregate Databases

These are large databases that combine single-topic databases. They are convenient to use and often provide access to databases to which your library may not subscribe as stand-alone products. Keep in mind that the databases discussed next are not accessible for free. Many academic libraries make these products available to students, researchers, and scholars as part of their service to their user, the cost being covered by tuition or other sources of revenue. As a student you will need to learn how to log into these products via your particular library's portal. If you do not have access through your library, you may be able to pay a fee for a personal subscription.

Professional Development Collection

Designed for professional educators, this database provides a specialized collection of more than 750 education journals and magazines, 530 of which are peer reviewed; it also includes more than 220 educational reports. Access to full-text articles is available as far back as 1965.

Academic Search Premier and *Academic Search Complete*

Academic Search Premier and *Academic Search Complete* are both products available via EBSCO's platform, EBSCOhost. They are the world's largest academic multidisciplinary databases, providing full-text articles of more than 4,000 peer-reviewed scholarly publications and indexes and nearly 6,000 peer-reviewed scholarly publications. These databases cover academic areas such as the social sciences, education, the humanities, language and linguistics, computer sciences, arts and literature, and engineering since 1975.

Web of Science

Formerly called the *Web of Knowledge*, this database has included the *SCI* and *SSCI* since 1987. It includes many useful indexes and abstracting databases, including MEDLINE. This makes the *Web of Science* invaluable when dealing with interdisciplinary topics that combine education with other fields of study.

JSTOR

The primary value of JSTOR is its role as an archive of journal information that often reaches back to the inception of many journal titles. Some content dates back to the 19th century. This not-for-profit organization's search and store database can be accessed for a fee by way of a JSTOR username and password or through a participating institution such as a library. Since 1995, it has been building a high-quality interdisciplinary archive of scholarship in the humanities, social sciences, and sciences. More than 2,400 academic journals and 10 million articles, books, and primary sources are included in its continuously expanding collection, all of which are full-text searchable.

Google Scholar

Available at http://scholar.google.com, Google Scholar is an online search engine that targets scholarly materials, such as peer-reviewed publications, book chapters, and conference

proceedings, across many disciplines. This search engine can identify relevant material throughout the world of scholarly research. Search results in Google Scholar are ordered by relevance, so when a search is conducted, those links listed first should be most relevant to your search. The relevance ranking is determined by the text in the article, the article's author, the publication, and the frequency of the citation of the article in the scholarly literature.

WorldCat

WorldCat A catalog that itemizes the collections of 72,000 libraries in 170 countries.

The world's largest bibliographic database, **WorldCat** is invaluable to researchers in nearly any field. This union catalog, started in 1971, indexes the holdings of 72,000 libraries and museums in 170 countries and provides access to bibliographic records for 1.77 billion physical and digital assets, including books, journals, music scores, video recordings, films, newspapers, maps, dissertations, manuscripts, and more in 470 languages. The catalog includes all the holdings of most major academic libraries, larger public libraries and specialized collections, and the national libraries of France, Great Britain, Canada, and the U.S. Library of Congress, to name a few. Although no abstracts are given, the libraries that hold each item are listed as part of the item records; this can be helpful information for either the researcher or the interlibrary loan staff to use in obtaining an item. Table 3.1 provides a summary of various databases with their respective web addresses.

3-3i Discovery Tools

Discovery tools represent the next generation of search platforms for researchers. A discovery tool seeks to tear down the silos in which data are stored, as is the case with many of the databases discussed earlier, and provide access through a single unified index operating in much the same way as a Google search. By using a discovery tool, a researcher is able, in one search, to search a variety of databases from different vendors as well as a library's holdings of books, journals, audio and video recordings, and digital assets. Discovery tools such as EBSCO Discovery Service, Primo (a product of Ex Libris), and the Summon Service (from ProQuest) are a few of the products currently on the market. These tools, as well as others that are sure to enter the marketplace, will

Table 3.1 Major Useful Databases for Educational Research

Databases	Information Available At
Primary databases	
ERIC	www.eric.ed.gov
PsycINFO and *PsycARTICLES*	www.apa.org
Aggregate databases	
Academic Search Premier	www.ebscohost.com/academic/academic-search-premier
Professional Development Collection	www.ebscohost.com/us-elementary-schools/professional-development-collection-main-edition
Web of Science	www.clarivate.com
Google Scholar	http://scholar.google.com
WorldCat	www.worldcat.org
JSTOR	www.jstor.org

undoubtedly simplify the task of searching for information by improving efficiency and increasing the discovery of new material. Although the speed and efficiency of collecting information has improved, and will continue to improve in the future, the researcher's task of making sense of the information, evaluating it critically, and using it to create new ideas remains the same.

3-4 The Necessity of Mastering Online Database Searching

It is essential to learn how to do online searching for several reasons:

1. Many important indexing and abstracting periodicals no longer exist in hard copy. For example, ERIC no longer prints *Resources in Education* and *Current Index to Journals in Education*. The ERIC database, which includes what was once in the periodicals, now exists only in electronic form. Many libraries subscribe only to the electronic equivalents of indexing and abstracting periodicals.
2. In a manual search, you must examine numerous periodical indexes for a particular topic, follow the topic through the indexes, and find a few relevant entries that combine your selected term with another interest. Computers can search for many topics at the same time and combine them using Boolean logic. Electronic database searches yield results that are more comprehensive, precise, accurate, and organized than the results of manual searches.
3. Computer searching saves time because in only seconds the computer can retrieve and print information, eliminating the hours or even days required for a manual search.
4. Online databases are frequently updated weekly or biweekly and thus are usually more up-to-date than printed indexes.
5. You can narrow your search by specifying parameters such as date and type of publication, language of publication, publication date (descending or ascending order), alphabetically by author, or by title.

It does take time and effort to master the use of electronic databases, but in academia today it must be done. The different resources available at various libraries create complications, as do changes in resources within an individual library. You will probably need the assistance of librarians and colleagues to learn how to search electronic databases. Sometimes you may elect to contact a website and find out the cost to run your specific search.

3-5 Free Resources on the Internet

The vast majority of college and university students have experience using the Internet. Since the Internet became available to the public, the growth in its use and in its variety of uses, both legitimate and suspect, has been unprecedented. As reviewed in this chapter, there exist a wide range of Internet sources for scholarly literature and test sources as well as a magnitude of other types of information. The Internet can help researchers access different databases of various types of materials and subjects throughout the world.

The strengths of the Internet, however—namely its size and comprehensiveness—can work against the beginning researcher and may confound even the most experienced one. The old problem of not finding enough information has been replaced by the equally vexing problem of finding far too much information and needing to

determine its relative quality. There is no real "publication cycle" for some Internet resources, and for many there are no peer-reviewers, editors, fact checkers, or proofreaders. In such cases, there is no accurate way for the reader to ascertain the authority of the author as there is in traditional publishing. As a result, a huge amount of information exists on the Internet, some erroneous, outdated, slanted, and even harmful. The websites of biased authors, hate groups, Holocaust revisionists, conspiracy theorists, and falsely generated information are the more extreme examples.

It is often more difficult to determine the worth of a website than that of a print source because many personal sites look as professional and authoritative as a governmental or educational site. A good place to start is to consider the end of the URL or web address. Sites ending in *.edu* or *.gov* are education or government sites, which tend to have more credibility than sites ending in *.com*, *.org*, or *.net*. Many libraries and organizations provide lists of subject-specific websites for researchers.

3-5a Evaluating Internet Sources

Because the Internet offers a great deal of information—the worthy and the suspect, side by side—it is important that the researcher has criteria by which to judge Internet sources. Generally speaking, fee-based products provided via a college or university have greater authority, accuracy, and credibility than free sites located via a search engine such as Google or Bing.

Determining the quality of a given print journal's articles has traditionally focused on the following criteria:

- Reputation of the journal
- Stringency of its editorial policies
- Reporting of primary research, as opposed to feature articles synthesizing or summarizing bodies of research for the lay audience
- Use of blind reviews
- Reputation of its reviewers
- Its affiliation with distinguished learned societies
- The presence or absence of advertising
- Audience for which the journal is intended, scholarly versus the lay audience

All these criteria have been used as ways to determine the relative worth of a particular journal source. These criteria help a novice researcher determine the quality of the article he or she is looking at. However, when accessing research from web versions of formerly print-based journals, journals that exist solely in electronic form, or accessing the full text of articles from a variety of sources using a database (such as ERIC) as a gateway to full-text content, these criteria become less easily applied, even irrelevant. A web-based magazine for the general reader may look as professional and authoritative as a governmental or educational site, and the standards or editorial policies used in the choice of articles to include can be difficult to determine.

Authority

The first step in establishing the authority of any research is identifying the person responsible for its creation. Is the author of the resource identified? Is a "snail mail" or e-mail address given so that you can contact him or her? Has the author published other works in the same, or another, field of study? This can be checked easily by searching the author's name in the library catalog or the journal indexes discussed previously. It is best if his or her work has appeared in a peer-reviewed journal. Is the author affiliated with a university, professional organization, or community organization? Is there a link

to the sponsoring group's home page, a description of the group, or contact information? For information found online, what is the site extension? Web addresses end in a suffix such as *.edu* or *.com*. This suffix gives the researcher an idea of who is hosting the website, as follows:

.com A commercial site

.edu A college or university

.gov The U.S. government

.us Usually a state government, community college, or school district site

.org An organization

.net A community network or Internet service provider

Although you cannot be assured of the quality of information on any given site, educational and governmental sites usually contain authoritative information. Information provided by some commercial companies may be slanted to sell their products. In fact, it may be difficult to distinguish between an advertisement and a source of objective information.

Accuracy

Is the resource part of an edited publication? Has it been selected by a reviewer or an editor? Are factual statements supported with bibliographies, endnotes, or links to the sources used? Are the sources cited, with complete bibliographic information including the date?

Timeliness

Is it clear when the information was originally published? For web-based information, is there a date listed when the page was last updated? Are links to outside web pages still active, or are they linking to sites that have moved or changed addresses?

3-5b Online Journals

In recent years, many journals have been produced exclusively online; these are frequently referred to as e-journals. That is, these journals are not available in print but are only available on the Internet. Such resources are often referred to as "born digital."

In education, the premier research association is the American Educational Research Association (AERA). Within AERA, subgroups address particular interests in educational research. These are called divisions and special-interest groups (SIGs). One such SIG is the Communication of Research SIG. This SIG maintains a website listing many of the online journals in the field of education. The SIG and the listing of e-journals are available at http://aera-cr.asu.edu/index.html. This website provides access to the content of nearly 200 e-journals.

Open access (OA) journals are scholarly journals that are available online via the Internet without going through a library database and have often been through a peer review process. The Directory of Open Access Journals (DOAJ) also is a community-curated online directory that indexes and provides access to high-quality, open access, peer-reviewed journals. You can see more than 350 education-based online OA journals at https://doaj.org.

3-6 Organizing the Related Literature

Once you are satisfied that you have carried out a reasonably comprehensive search of the literature in the field, you can proceed to the task of organizing it. A useful approach is to arrange the studies by topic and determine how each topic relates to your own study.

Avoid the temptation to present the literature as a series of abstracts. Rather, use it to lay a systematic foundation for the study. Present the literature in such a way as to justify carrying out your study by showing what is known and what remains to be investigated in the topic of concern. The hypotheses provide a framework for such organization. Like an explorer proposing an expedition, the researcher maps out the known territory and points the way to the unknown territory to be explored. If your study includes several facets or investigates more than a single hypothesis, the organization process is done separately for each hypothesis.

It is almost inevitable that a number of the reports you have carefully studied and included in your notes will, upon reflection, prove only peripherally related to the topic. It is neither necessary nor desirable to include in a proposal every study encountered in the search through the literature. Your readers will not be impressed by mere quantity. Relevance and organization of the material are of prime importance.

The researcher who fails to approach the task of assembling the related literature in a systematic manner from the beginning can become very disorganized. The following suggestions may be of assistance. Your university, department, or research adviser may offer help sessions or minicourses, and the librarians at most institutions can also provide helpful suggestions.

1. *Begin reading the most recent studies in the field and then work backward through earlier volumes*. An obvious advantage of this approach is that you start with studies that have already incorporated the thoughts and findings of previous research. Earlier misunderstandings have been corrected, and unprofitable approaches have been identified. Another advantage is that these studies include references to earlier works and therefore direct you to sources you might not otherwise encounter. Obviously, limits must be set to the process of gathering related research. On the one hand, laying meaningful groundwork for a study entails including all the important works in the field. On the other hand, devoting excessive time to this endeavor could result in boring the readers of your report with superfluous detail. Make sure the related literature serves—but does not dominate—your own work.
2. *Read the abstract or summary sections of a report first to determine whether it is relevant to the question*. Doing so can save much time that might be wasted reading unhelpful articles.
3. *Before taking notes, skim the report quickly to find those sections that are related to the question—another way to save reading time*.
4. *Make notes on file cards, in a word-processing program, or in some format that can be accessed easily or clustered with other notes on related research*. This begins to organize the review. With the prevalence of reference and database programs such as EndNote and Mendeley on virtually every computer, and stand-alone software packages such as RefWorks also available, note taking and data manipulation are significantly easier than they were when previous editions of this text were published. EndNote, Mendeley, and RefWorks all offer a free download trial, which will help you get started.
5. *Write out a separate complete bibliographic reference for each work. For the sake of record keeping, include the reference in the bibliography list and with the individual note card with the notes on the source*. A bibliography typically includes author, title, publisher, year, issue and volume numbers, and/or the universal resource locator (URL) or web address; the date you accessed an electronic source; and other information depending on the type of sources. Follow the most recent edition of the chosen style manual for citing references. There are websites that provide help in using the American Psychological Association and Turabian style manuals (see Chapter 14), which may be good places to begin. Add the library call number, or URL of the source to facilitate finding the work again, should it be necessary.

6. *To facilitate sorting and organizing, do not put more than one reference on each page, entry, or card*. It is not possible to arrange references alphabetically or in any other way unless they are recorded singly.
7. *Be sure to indicate which parts of the notes are direct quotations from the author and which are your own paraphrases*. Failure to make this distinction can lead to inadvertent plagiarism. It is very easy to imagine that a passage from another source is your own creation after living with it for weeks or months, so be sure to document your material carefully. The consequences for plagiarism, intentional or unintentional, can be severe. It is also wise to clearly separate the author's evaluation of his or her research from your own conclusions.
8. *If you searched online databases, keep the search strategies* (*often called "search histories"*) *on file*. Typically, a database will give the option of printing out a search history, the list of searches typed in, along with the results. This information will help in the retrieval of information and reduce cost and time in case an update is needed.

RESEARCH IN THE PUBLIC EYE

The *New York Times* (Harris, 2017) posted an article about New York City "public school students living in homeless shelters has increased in each of the last five years, reaching nearly 33,000" in the 2015–2016 school year. According to the article, homeless students are clustered geographically; last year, more than 40 percent attended schools in the Bronx. But the number of homeless students has increased in every borough in the last five years. Harris reports that the challenge of serving many homeless students is compounded for schools by the small amount of money set aside to help.

Assume you were asked to help find solutions and write a report to the school board about how to help with this topic and make recommendations about what schools should do.

- Where would you look to find solutions?
- What keywords would you use to search?

Summary

A thorough knowledge of related literature is important for both quantitative and qualitative studies. Quantitative researchers need to become familiar with previous research in their field of study so that their work is based in, and expands on, previous research in that area. For qualitative researchers, the study of related literature usually follows their research; that is, the researcher looks at the related literature to determine how his or her research fits in with what is already known.

Sources of related literature can be found by manual searching, but this is slow and tedious. Now that electronic databases hold most of the information that researchers need, you must develop electronic searching skills, using Boolean logic. You must also investigate your local library's resources and make use of the assistance that your librarian can give you.

There are many indexing and abstracting products, covering many fields. ERIC and *PsycINFO* databases are probably the most useful to educators, but you need to be aware of the many other resources available to you, especially if your topic is interdisciplinary. Citation indexes like the *Web of Science* should be consulted because they enable researchers to follow topics of interest both backward and forward in time. Other publications cover statistical information and government publications. Aggregate databases combine single-subject databases, allowing a single search to cover many different databases.