

CHAPTER 4

Reviewing the Literature

If I have
seen fur-
ther it is by
standing on
the shoul-
ders of
giants.

Sir Isaac Newton
(1642–1727)

INSTRUCTIONAL OBJECTIVES

After studying this chapter, the student will be able to:

- 1 Describe the role of related literature in quantitative research.
- 2 Identify the main functions of a literature review in quantitative research.
- 3 Describe the role of related literature in qualitative and mixed methods research.
- 4 Use Boolean logic to prepare a search statement.
- 5 Apply appropriate criteria to use in judging the merit of literature you find.
- 6 Identify indexes and abstracting serials especially useful to educators.
- 7 Describe and use primary databases for efficient location of literature.
- 8 Describe and use aggregated databases for efficient location of literature.
- 9 Describe sources of statistical data.
- 10 Identify useful government sources.
- 11 Detail a systematic progression of steps in organizing the literature, explaining the purpose of each step.
- 12 Understand the criteria to use in judging the merit of information on the Internet.

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

THE ROLE OF RELATED LITERATURE IN QUANTITATIVE RESEARCH

Quantitative researchers are urged not to rush headlong into conducting their study. The search for related literature should be completed before the actual conduct of the study begins in order to provide a context and background that support 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 2000 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 to 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 to limit their research question and to 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 in clarifying the constructs involved in the study and in translating 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 these constructs and to define them operationally. 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 begin

to notice that not all studies in any one field are necessarily equal. You will soon be critiquing studies and noticing ways in which they could be improved. For example, early studies in any one particular field may seem crude and ineffective because research methodology and design are constantly being 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 change the proposed plans and investigate a different aspect of the problem.
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 the findings of their research 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.

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 (1978), “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” (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” (p. 31).

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.

EFFICIENT LOCATION OF RELATED LITERATURE

In the past, and sometimes even today, researchers had to go to their libraries and search manually for information related to their research topic. Doing a manual search requires that you first decide what key words (or **descriptors**) best fit your topic and then look at the periodicals on the library shelves to find those most likely to include your area of interest. Using your key terms, seek your topic through the periodicals' indexes to locate relevant articles. Make sure that you note at this time all relevant bibliographic details—author, title, journal name, data, volume number, and pages.

However, manual searching of this kind is time-consuming and inefficient. Currently, most universities and colleges and many public and private libraries subscribe to indexing and abstracting periodicals that are incorporated into several databases that can be searched by computer.

Computers 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 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 spelling to early primary students, you would start by finding all appropriate descriptors for spelling instruction and for primary grades. If you connect these with *AND*, you will only get documents that have both descriptors. If, instead, you use *OR*, you will get a flood of information about spelling instruction in all grades together with a second flood about primary grades not necessarily confined to the teaching of spelling. So as not to get drowned in useless information, you can narrow your search by adding descriptors to either side of your *OR* equation. Thus, think of *OR* as an inclusive operation and *AND* as a selective operation. The third option, *NOT*, is an exclusive operation. If you wished your search to be only of U.S. publications, you would add *NOT* foreign countries. Thus, your search string would read Spelling Instruction *AND* Primary Grades *NOT* Foreign Countries. 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*.

The circles in Figure 4.1 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 includes all the documents with either construct A or construct B. The circles on the right include documents with construct A but not construct B.

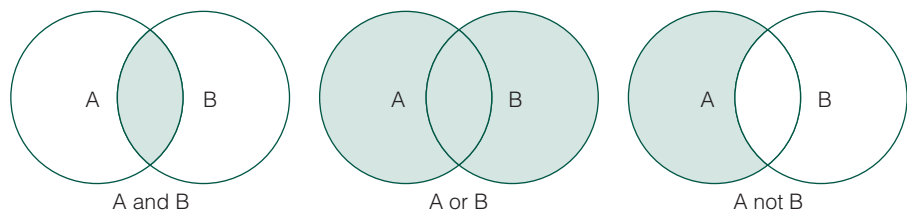


Figure 4.1 Shaded Areas Represent What Is Retrieved by Each Logical Statement

For example, a search of the ERIC database 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, which was discussed in Chapter 1. In every study, more changes were from wrong to right, as had been the case in all the previous studies.

INDEXING AND ABSTRACTING DATABASES

Indexing and abstracting periodicals are vital for locating primary sources in your field. These publications subscribe to professional journals in a given discipline. Their staff then identifies the key terms for each article, indexes them, and typically provides an abstract for each article.

Databases that combine several of these indexing and abstracting periodicals are very useful because you can ask for your key terms of interest and the database will identify the journal articles by journal, date, volume number, and pages that include your key terms.

ERIC (Educational Resources Information Center)

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 800 journals and more than 1 million other 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 IDs of these documents begin with ED. Only later were professional journals added to the ERIC database. The IDs of journal articles begin with EJ. You can download the full text of ED materials. With EJ articles, only key terms (which ERIC calls descriptors) and abstracts can be downloaded.
3. It can be accessed for free from your home or office terminal at 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 evaluated on four criteria to determine what is included and what is not:

1. Relevance of the submission to education
2. Quality of the submission (completeness, integrity, objectivity, substantive merit, and utility/importance)
3. Sponsorship by professional societies, organizations, and government agencies
4. Editorial and peer review criteria

Using the ERIC System

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

1. Determine the key words (descriptors) under which articles relevant to your study might be listed. These key words will typically include the population and the variables you have identified in your problem statement.
2. Since the ERIC system only recognizes descriptors from its own thesaurus, you will need to find which of your key words are used as descriptors. You may need to find synonyms for some of the key words you have listed.
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, go to your library and seek out the article.
5. Search out articles in their journals at your own institution or through inter-library 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 indexes.

Most other databases charge for their services. Fortunately, most universities, colleges, and many libraries subscribe to at least some databases and make them available to their clients and, in most cases, to anyone who wants to use the libraries' terminals on site. Check with your library to determine what databases you can access through its services. This often changes as libraries' budgets wax and wane.

OTHER EDUCATION-FOCUSED PERIODICAL INDEXES

There are many other periodical indexes in the field of education that are useful for locating up-to-date information on research, as well as contemporary opinion. One of the standard indexes in the field is *Education Index*, which has been published regularly since 1929. This index lists articles in 478 periodicals, yearbooks, bulletins, proceedings, and monographic series. ERIC does not index 92 of these 478 periodicals. *Education Index* is the best source for locating journal articles published prior to the establishment of ERIC. A disadvantage of *Education Index* is that it does not include abstracts. H.W. Wilson, the publisher of *Education Index*, has since 1994 produced the electronic database, *Wilson Education Abstracts Full Text*. This database provides abstracts of articles in *Education Index*, as well as the full text of articles from the 150 journals considered to be the most important in the field. *H. W. Wilson Select Database*, with over 560,000 records, includes indexes and abstracts for many different professional fields, including *Social Sciences Index* and *Humanities Index*. It also includes indexes to popular

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Joe Rocco

magazines such as *Readers Guide to Periodical Literature*. *Education Index* is still available as a printed periodical.

Exceptional Child Education Resources (ECER) is a quarterly publication that contains abstracts of resources in special and gifted education. It uses the same thesaurus, indexing, and abstracting rules that ERIC does, and there is considerable overlap with 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 since 1927, 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.

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

OTHER USEFUL DATABASES

Only ERIC is more useful to educators than PsycINFO. PsycINFO is a database with nearly 2 million records covering 2000 journals, in addition to books and book chapters. The material covered in this database is related to psychology, education, business, economics, linguistics, social work, health care, and many other fields. PsycArticles is a subset of PsycINFO that offers full text for some of the journals referenced through PsycINFO. Information about these databases is available at www.psycinfo.com. The source of its information is the periodical *Psychological Abstracts*, which has been indexing and abstracting psychology and related journals since 1887. 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.

CITATION INDEXES

Having access to the *Social Science 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, which can go forward or backward in time. If you have read a particularly useful article that was published in 1996, through subsequent indexes you can identify more recent articles that cite this article and list it in their references or you can find out which earlier writers were cited by this author. The Institute for Scientific Information (ISI) publishes *SSCI*, *SCI*, and *A&HCI* quarterly, yearly, and in 5-year compilations using the same format for each. ISI subscribes to all the important journals and somewhat important journals in each of its three general areas. For example, *SSCI* currently receives more than 2000 journals to produce its annual serial. We use *SSCI* in our description 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 of the sources 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 go 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, 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 article or 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 4.2 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 alphabetical listing of the names of authors whose titles contain the words is provided for each paired primary term and co-term. You can then find bibliographic information for each author in the *Source Index*.
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 paper and online formats. Most libraries have neither, as they are fairly expensive. However, *SSCI*, *SCI*, and *AHCI* can be accessed through the electronic aggregate database Web of Science (see pages 72 and 73). Many academic libraries subscribe to Web of Science. After determining what indexes or databases you need consult your librarian on what library resources to use to access them.

Books in Print

As you would expect, *Books in Print* indexes those books that are currently in print both by author and by title. It enables you not only to learn what books are and are not in print but also which books have new editions and which have added or dropped authors or changed publishers. Brief reviews are frequently included.

Tests in Print and Mental Measurement Yearbook

Tests in Print, produced by the Buros Institute at the University of Nebraska, does the same for commercially available tests. If you find a test that interests

	Web of Science First Author	Journal Title/ Work Being Cited	Year	Vol	First page
	SMITH TW	JOURNAL OF TEACHER EDUCATION Title: <u>Toward a prototype of expertise in teaching - A descriptive case study</u>	2004	55	357
	=====				
Citing Author	AU Sakamoto, A				
Title	AF Sakamoto, Atsushi				
Journal	TI How do in-service teachers learn from their teaching experiences?				
Abstract	SO JAPANESE JOURNAL OF EDUCATIONAL PSYCHOLOGY				
	AB The present study reviewed research about in-service teacher learning that was published in the U.S. since 2000, as well as recent research published in Japan. In-service teacher learning was examined comprehensively from 3 perspectives: (1) learning from teaching experience, (2) school-wide contexts that support teacher learning, and (3) the longitudinal process of teacher development. Seeing teachers as "reflective practitioners" means that reflecting on teaching experiences constitutes a central point of in-service teacher learning. The present review of studies about pre-service and new teachers revealed relationships between reflection and both teaching beliefs and knowledge construction. The present review of studies on the teacher community and lesson study suggested that teachers learn from their interactions and conflicts; they also learn how collective learning occurs through lesson study as part of their school-wide professional development. The present review of research on teacher development and expertise suggested that teachers personalize their teaching, and that teachers are "adaptive experts." Further research is needed on the beliefs of in-service teachers, the development of empirical research methods for studying the development of collegiality, and teacher learning in Japan.				
Citing Author	AU Oriand-Barak, L				
Title	TI Lost in translation mentors learning to participate in competing discourses of practice				
Journal	SO JOURNAL OF TEACHER EDUCATION				
Abstract	AB Situated in the context of Israeli in-service education, this article explores the development of the author's understanding of the process of learning to mentor from the acquisition of communicative competencies (as identified in an initial study), toward a more discursive view of the process as "participation in competing discourses of practice" (as identified in subsequent studies). Recent work has revealed the intricacies and complexities entailed in translating from one language (teaching) to another (mentoring), often positioning mentors as "lost in translation." Specifically, studies shed light on issues of morality, expertise, context, and conditions for learning to mentor. To discuss the author's evolving understandings, she attends to three interrelated themes: Mentoring as connected to teaching, mentoring as distinct from teacher, and conditions for learning to mentor. Finally, the author addresses the question, So that? to consolidate her emergent understanding of the metaphor, framed as assertions for thinking about the practice of mentoring.				

Figure 4.2 Example of SSCI Citation Entry (from 2008)

you in *Tests in Print*, you are referred to the appropriate volume of *Mental Measurements Yearbook (MMY)* (also published by the Buros Institute) for more information on the test (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 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. Fax services are also available.

If you cannot find the test you want in *Test Reviews Online*, the Buros Institute recommends searching the Educational Testing Service (ETS) website. ETS maintains information on more than 20,000 commercial and research instruments, although it does not provide evaluations.

STATISTICAL SOURCES

For educational statistics, the federal government, followed by states and local governments, accounts for the greatest number of statistical documents. *Statistics Sources* (Wasserman-O'Brien, 2001), a basic **statistical sources** reference work, is an alphabetic guide to sources of information on more than 20,000 subjects, with 10,000 citations from more than 2000 sources, print and nonprint, in print and out of print, and domestic and international. It is a subject guide to data on various topics, including education, for the United States and other nations. The 2000 edition of this work also includes listings of the Federal Statistical Databases and Federal Statistical Telephone contacts. Several other commonly known reference works—such as *World Almanac and Book of Facts*, *Information Please Almanac*, and *Statistical Abstract of the United States*—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 published by the Washington-based Congressional Information Service 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, and the *SRI* indexes and abstracts state documents. The latter 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 also available in CD-ROM and online.

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 especially on the results of surveys and activities carried out by the National Center for Education Statistics (NCES). As noted previously, the full text of the digest and other important statistical publications are searchable through the NCES website (<http://nces.ed.gov>).

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' *Monthly Catalog of U.S. Government Publications* (or its online counterpart *GPO Monthly Catalog*, published 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-key word indexes. Annual compilations by title and subject were included in each December issue until 1975; since 1976, 6-month compilations have been published. There are also 5-year cumulative indexes for faster searching back through the years. The online GPO catalog has become very prevalent in academic libraries because it is easy to search. It goes back to 1976.

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 on the Internet or on CD-ROM. The gateways for government information and publications on education are the U.S. Department of Education website at www.ed.gov, and the National Center for Educational Statistics website at <http://nces.ed.gov>. From these sites, 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 1998 *Digest* includes 428 tables from many different data sources. *Projections of Education Statistics to 2009* provides projections for key education statistics. It includes statistics on enrollment, graduates, classroom teachers, and expenditures in elementary and secondary schools, and 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 2009. The *Condition of Education* describes the current status and recent progress of education in the United States. The 1999 compendium features an overview essay and 60 indicators in five major substantive areas of education.

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 1 million dissertations and theses completed at more than 1000 accredited colleges and universities worldwide can be found through this source. It can be searched by key words, titles, and authors. Its hard copy form is *Dissertation Abstracts*.

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 websites do not subscribe.

Professional Development Collection

Designed for professional educators, this database provides a specialized collection of more than 550 important education journals; it also includes more than 200 educational reports. (Available at www.ebsco.com.)

Academic Search Premier

Academic Search Premier, the world's largest academic multidisciplinary database, provides full-text articles of more than 4700 peer-reviewed scholarly publications and indexes and more than 9000 peer-reviewed scholarly publications. This database covers academic areas such as the social sciences, education, the humanities, language and linguistics, computer sciences, arts and literature, and engineering since 1975. (Available at www.epnet.com/academic/acasearchprem.asp.)

Web of Knowledge

This database has included the Science and Social Sciences Citation Indexes since 1987. It also includes many other useful indexes and abstracting databases, including MEDLINE.

JSTOR

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. Since 1995, it has been building a high-quality interdisciplinary archive of scholarship in the humanities, social sciences, and sciences. More than 1000 academic journals and other materials are included in its continuously expanding collection, all of which are full-text searchable.

Google Scholar

Available at <http://scholar.google.com> as of November 2004, Google Scholar is an online search engine that targets scholarly materials, such as peer-reviewed publications, book chapters, and conference proceedings, across many disciplines. With this database, you 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

The world's largest bibliographic database, **WorldCat**, is invaluable to researchers in nearly any field. This online database indexes more than 35 million books, journals, music scores, video recordings, films, newspapers, maps, dissertations, manuscripts, and more in 400 languages. The index includes all the holdings of most academic libraries of size, 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 4.1 provides a summary of various databases with their respective web addresses.

Table 4.1 Major Useful Databases for Educational Research

Databases	Information Available At
Primary databases	
ERIC	www.eric.ed.gov
PsycINFO and PsycArticles	www.apa.org/psycinfo
Aggregate databases	
Academic SearchPremier	www.ebscohost.com/ thisMarket.php?marketID=1
Professional Development Collection	www.ebscohost.com/thisTopic .php?topicID=123&marketID=1
Web of Knowledge	www.isiwebofknowledge.com
Google Scholar	http://scholar.google.com
WorldCat	www.worldcat.org
JSTOR	www.jstor.org

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 no longer subscribe to the hard copy versions of indexing and abstracting periodicals and subscribe only to their electronic equivalents.
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, more precise, more accurate, and more organized than the results of manual searches.
3. Computer searching saves time because in only seconds the computer can retrieve and print information, eliminating hours or even days 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. With computer searching, 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 one website and find out what it would cost to do the search you need.

THE INTERNET

The vast majority of college and university students have experience using the Internet. Since the Internet has been available to consumers, the growth in Internet use, and in the variety of uses, both legitimate and suspect, has been unprecedented. As reviewed in this chapter, there are 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 strength of the Internet, however—namely its size and comprehensiveness—can work against the beginning researcher and may confound even the most experienced researcher. 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 be able to determine the relative quality of the information. Because there is no real “publication cycle” for Internet materials, there are no editors, fact checkers, or proofreaders, and there is no accurate way for the reader to determine the authority of the author, as there is in traditional publishing. A huge amount of information exists on the Internet, some erroneous, outdated, slanted, and even harmful. The websites of hate groups, Holocaust revisionists, conspiracy theorists, and other biased authors are the more extreme examples, but one can also find such things as a free online *Webster’s Dictionary*—copyright 1913!

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. One place to start is to consider the end of the 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.

EVALUATING INTERNET SOURCES

Because the Internet is a means by which a great deal of information of varying quality can be presented—the worthy and the suspect side by side—it is important that the researcher has criteria by which to judge Internet sources.

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
- Journal’s 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 whether the article he or she is looking at is likely to be of high quality. 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

Is the author of the resource identified? Is a “snail mail” address or e-mail address given so that you can contact him or her? 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 on the web, 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 kind of site, educational and governmental sites usually contain authoritative information. Information provided by 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 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? If there are links given to outside web pages, are the links still active or are they linking to sites that have moved or changed addresses?

ONLINE JOURNALS

In recent years, many journals have been produced in a strictly online format and are frequently referred to as e-journals. That is, these journals are not available in print but are only available on the Internet. 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>. Through the website, the content of nearly 200 e-journals can be accessed.

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 of these topics 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, on 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 own 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 moved around to cluster with other notes on related research.* This begins to organize the review. With the prevalence of spreadsheet and database programs such as EndNote and ProCite on virtually every computer and stand-alone software packages such as RefWorks also available, note taking and manipulation of data is significantly easier than it was in earlier versions of this text. EndNote, ProCite, 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 19), which may be good places to begin. Add the library call number, location of the terminal, 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 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, any given 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.

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, research that has previously been done in that area. For qualitative researchers, the study of related literature usually follows

their research, when 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 learn what resources your local library has and make use of the assistance that your librarian can give you.

There are many indexing and abstracting periodicals, covering many fields. The ERIC system and PsycINFO are probably the most useful to educators, but you need to be aware of the many other resources available to you. Citation indexes should be consulted since they enable researchers to follow topics of interest both backward and forward in time. *Books in Print* and *Tests in Print* are also important sources. There are other publications covering statistical information and government publications. Aggregate databases combine single-subject databases, allowing a single search to cover many different databases.

KEY CONCEPTS

aggregate databases
Boolean logic
citation indexes
descriptors
electronic databases
ERIC database

function of related literature
government publications
indexing and abstracting
periodicals

related literature
statistical sources
WorldCat

EXERCISES

- Which of the following are recommended strategies for organizing a literature search?
 - Organize studies by topic.
 - Begin with early articles and work forward in time.
 - Read the abstract or summary sections of a report first.
 - Skim the report to find those sections that are related to the chosen questions.
 - Write out a complete bibliographic reference for each work.
- According to the text, what are three important roles of incorporating related literature in a research project? In your opinion, which role seems most important to you in your current or future research?
- Conduct a search on the same general topic in both ERIC and *Education Index*. Compare the usefulness of ERIC and *Education Index* in finding related research on your topic. Compare and contrast two of the following: the quality of abstracts, the journals covered, and the subject terms or descriptors used by the index. Which index do you predict would be the most useful in finding research on your topic?
- Explain the organization and the purpose of the *Mental Measurements Yearbook*.
- What purposes might searching the *Social Science Citation Index* serve? In addition to information about an article's citation record, what conclusions might the *SSCI* help you draw about an author or about a journal?
- What conclusion could be drawn regarding a work, published in 1966, that was cited in 20 articles listed in the 2009 Source Index of *SSCI*?
- If you were interested in the effect of teachers' stereotyping on the achievement of girls in math classes, what are some terms for which you might search? Illustrate how you might combine them into online search statements with Boolean operators AND, OR, or NOT.
- How do indexing and abstracting periodicals, databases, and aggregate databases differ?

The Internet can be a source of information for the researcher, but it must be used with caution since there is no "quality control" comparable to the peer reviews that take place before papers are published in professional journals.

In order to be helpful to the researcher and interesting for the reader of a paper or dissertation, the related literature must be organized. Studies that are most relevant to the topic of the research reported on should be discussed first, giving as much detail as is necessary to confirm their relevance. Other studies that are peripheral to the research should be mentioned briefly, especially if they suggest additional studies that might be undertaken later.

9. Find two web resources on an education-related topic of your choice, one from a commercial (.com) site and one from an educational (.edu) site. Evaluate them using

the criteria of authority, accuracy, and timeliness. Are there notable differences between the sources? Explain.

ANSWERS

1. a, c, d, and e
2. Knowledge of related research enables the researcher to define the frontiers of the field, place the question in perspective, and avoid unintentional replication of previous studies. Defining the frontiers of research is especially important for a relatively inexperienced researcher, but any well-reasoned choice is acceptable.
3. Both provide a means to locate relevant journal articles. *Education Index* covers journals from 1929 to the present. ERIC includes more journals. Begun in 1966, it indexes articles using the ERIC thesaurus of subject descriptors and provides annotations. *Education Index* does not index unpublished literature. There are some periodicals that only *Education Index* covers, which tend to be newsletters and so on. Because *Wilson Selected Databases*, the electronic version of the index, tends to have shorter abstracts and also uses a controlled vocabulary that is less specific than the ERIC descriptors, most students will consider ERIC more useful, unless a student is doing historical research.
4. The editions of *MMY* provide the most comprehensive listing and description of standardized tests available, given its long publication history and the length and authority of its reviews. The critical reviews of the tests assist one in selecting an appropriate test.
5. *SSCI* provides a way to see what subsequent research has followed a particular article. You can draw tentative conclusions

about the influence of an author by looking at how often his or her work has been cited, and in turn, you can draw conclusions about the influential journals in a field by seeing how often those articles that are heavily cited seem to come from a cluster of important journal titles.

6. If an older article becomes heavily cited several years later, there may be several explanations: The research may have been treated by a noted scholar in a new way, a seminal piece of research may have recently been disproved, or the field of study may be experiencing a surge of interest because of a news event or finding.
7. Answers will vary, but terms mentioned would include *Females* (not *Girls*) AND *Teacher Attitudes* (not *Teacher Stereotypes*, which refers to stereotypes of teacher behavior and attributes) AND *Mathematics Instruction*, *Mathematics Education*, or *Mathematics*. *Sex Discrimination* or *Sex Stereotypes* might also be used successfully.
8. Indexing and abstracting periodicals subscribe to journals and sometimes other sources in a field. Their staff read and index them and usually produce abstracts that are published on a regular basis. This content is incorporated into an electronic database that makes searching much more precise, complete, and convenient. Aggregating databases combine single-topic individual databases to make searches even more convenient and through.
9. Answers will vary.

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