

# 6

## Synthesis of Related Literature

*A Definition  
The Procedure*

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In this chapter we look at the process of finding, collecting, analyzing and synthesizing research articles which relate to the topic of our study. Before we can add to the knowledge base of our field of study, we must learn what is already known. The literature search provides a factual base for the proposed study.

### A Definition

The related literature section of your proposal, entitled the “Synthesis of Related Literature,” is a *synthetic narrative of recent research which is related to your study*.

### Synthetic Narrative

The related literature section is a synthetic narrative. It is a *narrative* in the sense that it should flow from the beginning to the end with a single, coordinated theme. It **should not contain a series of disjointed summaries of research articles**. Such unrelated and disconnected summaries generate confusion rather than understanding.

It is *synthetic* in that it has been born out of the synthesis of many research studies. You will analyze research reports by key words. There may be twenty articles that provide information for a given key word. As you write your findings for each of your key words, you will draw from all of the articles addressing that key word simultaneously. **The final product will be a synthesis – a smooth blending – of selected articles built around the key words of your study**. This is the reason for the name of this section: “The *Synthesis* of Related Literature.” Not a summary, but a synthesis.

### Recent Research

The synthesis of related literature focuses on *recent* research. The rule of thumb in defining “recent” is ten years. You will want to select and include research articles which are **less than 10 years old**. Major emphasis should be placed on research conducted in the **past 5 years**. Articles older than this are out of date and misleading. Consider an opinion survey conducted in 1955 on the attitudes of Americans on “family.” Such information has little relevance to family attitudes today. Its only value would be to show the change in attitude since 1955.

Gather your information from research journal articles rather than books. Books are, by necessity, more out of date than the research they’re based upon. Research reports are **primary** sources of information, because they are written by those who conducted the study. Books are usually **secondary** sources; that is, sources written by authors not directly associated with the reported research: they merely compile re-

search results from many sources. Focus your synthesis on primary sources of information.

## Related to Your Study

Your Problem Statement and its associated operationalized variables define the boundaries of your literature search. Each and every footnote in the synthesis should directly relate to your subject. The purpose of the synthesis is not to provide filler for the proposal. The purpose is to convey in a clear, focused way the present body of knowledge which relates to your intended study.

## The Procedure for Writing the Related Literature

Choose database

Choose sources

Determine keys

Search

Select articles

Analyze articles

Reorganize Material

Write Synthesis

Revise Synthesis

### Choose One or More Databases

A “database” is a high-tech term which refers to a collection of information in a particular field of study. The information stored in a database includes research reports, formal speeches, journal articles, minutes of professional meetings, and the like. These databases can be searched manually, by book-type indexes, or electronically, by computer. Manual searching costs little or no money, but consumes large amounts of time. Computer searches are fast and efficient, but can become expensive.

### E.R.I.C.

The Educational Resources Information Center (ERIC) was initiated in 1965 by the U.S. Office of Education to transmit findings of current educational research to researchers, teachers, administrators and graduate students.<sup>1</sup> Information is housed in 16 “clearinghouses” around the nation.<sup>2</sup>

### RIE

The ERIC system consists of two major parts. The first is the Resources in Education (RIE) which provides abstracts of unpublished papers presented at educational conferences, speeches, progress reports of on-going research studies, and final reports of projects conducted by local agencies such as school districts.<sup>3</sup>

### CIJE

The second major part of the ERIC system is the Current Index of Journals in Education (CIJE). The CIJE indexes articles published in over 300 educational journals and articles about educational concerns in other professional journals.<sup>4</sup>

In general, ERIC listings have less lag time than the Education Index or Psychological Abstracts. This means it will provide you with more recent research findings. Altogether, the ERIC system indexes and abstracts research projects, theses, conference proceedings, project reports, speeches, bibliographies, curriculum-related materials, books and more than 750 educational journals.<sup>1</sup>

<sup>1</sup>Walter R. Borg and Meredith D. Gall, *Educational Research: An Introduction*, 4th (New York: Longman Publishing Co., 1983), 153.

<sup>2</sup>See Borg and Gall, pp. 901-2 for addresses of clearinghouses.

<sup>3</sup>*Ibid.*, p. 153

<sup>4</sup>Charles D. Hopkins, *Educational Research: A Structure for Inquiry* (Columbus, Ohio: Charles E. Merrill Publishing Company, 1976), 221

## Psychological Abstracts

Published by the American Psychological Association, this publication lists articles from over 850 journals and other sources in psychology and related fields.<sup>2</sup> It gives summaries of studies, books, and articles on all fields of psychology and many educational articles.<sup>3</sup>

## Dissertation Abstracts

The Dissertation Abstracts database contains all dissertations written and registered since 1860. This is a rich resource not only of graduate level research findings, but also of research design and statistical analysis methods.

## Choose Preliminary Sources

Primary sources are research reports written by the researchers involved in the study. Secondary sources are compilations of research reports by authors not associated with the reported research. Preliminary sources are reference books and indexes which lead to specific research articles within a given database. Here is a brief list of some of the major preliminary sources.<sup>4</sup>

## Thesaurus of ERIC Descriptors

The pathway into the enormous ERIC database is a periodical called the Thesaurus of ERIC Descriptors. This publication contains a listing of all the key words used to categorize research articles and unpublished papers in the ERIC system. Similar indexes exist for Dissertation Abstracts and Psychological Abstracts databases.

## Education Index

The Education Index provides an up-to-date listing of articles published in hundreds of education journals, books about education and publications in related fields since 1929. For an index to educational articles for the years 1900 to 1929, check the Readers' Guide to Periodic Literature.<sup>5</sup>

## Citation Indexes

The Citation Indexes list published articles which references ("cites") a given article. My statistics professor at University of North Texas gave me a copy of a 1973 article on multiple comparisons one evening before class. He thought the questionable findings in the article would make a good dissertation study. By using citation indexes, I was able to quickly track down references to over fifty articles published since 1973 which cited the article he'd given me.

**The Science Citation Index (SCI)** provides citations in the fields of science, medicine, agriculture, technology, and the behavioral sciences.

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<sup>1</sup>Sharon B Merriam and Edwin L. Simpson, *A Guide to Research for Educators and Trainers of Adults* (Malabar, FL: Robert E. Krieger Publishing Company, 1984), 35.

<sup>2</sup>Borg and Gall, p. 150.

<sup>3</sup>Hopkins, p. 224

<sup>4</sup>See Borg and Gall, pp. 148-166 for detailed information on these and many other sources.

<sup>5</sup>Hopkins, p. 221

The **Social Science Citation Index (SSCI)** does the same for the social, behavioral and related sciences.<sup>1</sup>

### Smithsonian Science Information Exchange

The Smithsonian Science Information Exchange (SSIE) is the best preliminary source for recently completed and ongoing research in all fields. It has the least lag time between publication and indexing. Several services are offered, including research information packages on major topics, custom searches, and computer searches.<sup>2</sup>

### Mental Measurements Yearbook

The Mental Measurements Yearbook, edited by Oscar K. Buros, indexes articles and findings related to published tests. It gives “information regarding forms, manuals, grade levels, publishers, and prices of educational, psychological, and vocational tests, plus reviews of the tests by testing experts.”<sup>3</sup> It is published in six-year intervals and is an excellent source of finding a validated testing instrument for your proposal.

### Measures for Psychological Measurement

Provides information on over 3000 psychological measures that have been described in research literature. These are tests not published by regular test developers, so there is little overlap with Mental Measurements Yearbooks.<sup>4</sup>

These are some of the major sources. Check Borg and Gall for many more reference sources available to you. Also ask your professors to suggest major research journals in your field. University libraries are also a good resource for information on specialty databases.

### Select Key Words

Most databases are accessed through the use of key words, or descriptors. As we have previously noted, the key words for ERIC documents are published in the Thesaurus of ERIC Descriptors. Key words for Psychological Abstracts are published in the Thesaurus of Psychological Index Terms. Each database has its own set of key words.

Borg and Gall provide an example of a study and how one would go about doing a literature search. The study is “the academic self-concept of handicapped children in the elementary school.”<sup>5</sup> Key phrases in this study are “academic self-concept,” “handicapped school children,” and “elementary school students.”

There is no descriptor for “academic self-concept” in the Thesaurus of ERIC Descriptors. There are the descriptors “self-concept” and “self-esteem,” both of which appear to fit this study. Since there are no specific definitions of how reviewers used the terms, it would be wise to use both of these descriptors in the data search.

There are two descriptors for handicapped school children: “handicapped children” and “handicapped students.”

The final descriptor is “elementary school students.”

Using these ERIC descriptors, a search can be made manually or electronically through every document in the ERIC system. (We’ll follow this study in later steps).

<sup>1</sup>Borg and Gall, p. 156-7.

<sup>2</sup>Borg and Gall, 168-9

<sup>3</sup>Hopkins, 225

<sup>4</sup>Borg and Gall, 158

<sup>5</sup>*Ibid.*, 171

The bridge that connects your study to the documents in the databases you've selected is made up of the **descriptors, or key words**, that grow out of your Problem Statement and operationalized variables. Only key words that are known by the database will work. In the example above, we found that the descriptor "academic self-concept" does not exist in the ERIC system. Other key words had to be substituted. When I wrote a research proposal on "Research Priorities in Religious Education," the descriptor "Religious Education" led me to over thirty research articles. But none of the articles used the term the way Southern Baptists use it.

If you consider a study which has a **solid theoretical base**, you will find it easier to find descriptors. Ultimately, you will secure reports that provide a good foundation for your study. If your study is theoretically shallow, you will have difficulty finding descriptors. You will be barred from the world of scientific knowledge.

## Searching the literature

Having determined your key words, the next step to locate the research articles which are associated with them. We can do this manually by thumbing through the printed database index, or electronically by doing a computer search.

### Searching manually

To do a manual search for the key words listed above in the ERIC system, follow these steps:

1. Look in the ERIC index published in the most recent month of the current year. (Indexes for ERIC documents are published monthly; semi-annual volumes are published twice each year.)
2. Look up each of your descriptors in the "Subject Index" section.
3. You will notice that descriptors are organized in hierarchies. The higher up the hierarchy you find a descriptor, the broader it is (that is, the greater number of articles it references). The farther down the hierarchy you find a descriptor, the narrower it is (the fewer number of articles it references). Articles are referenced under the descriptors by "ED" numbers, such as ED 654 321.
4. Look up the ED number in the "Document Resumes" section of the ERIC index. Here you will find a brief description (an abstract) of the referenced article. You can usually tell from the abstract whether the article will be of help to you in your own study.
5. When you have found all the abstracts for all your descriptors in this index, move to the next earlier month and repeat the process.
6. When you have completed the current year, use the semi-annual volumes to search back through previous years.
7. Continue the process until you have located every ERIC document related to every descriptor back as far as you want the search to extend.

### Searching by Computer

A manual search requires a great deal of time because you must manually thumb through multiple volumes of database indexes. Just think about looking up each of four descriptors, along with their associated articles, in monthly and then semi-annual indexes for up to ten years! How much time do you have to sit in the Reference Section of your university library? But more important than wasted time is the limitation of doing only simple searches. This rules out searches such as "self-esteem" AND "elementary school children." Such a search would select only those articles which

relates to BOTH descriptors.

With a computerized database, you can search through literally millions of articles in seconds, and combine key words in complex ways. We can combine all our selected descriptors into a single search command for the computer. With one pass through all the ERIC documents, every article meeting the specifications of the command line will be selected from that database. Let's use our example to illustrate the process.

1. The library assistant responsible for doing computer searches dials up the data base.
2. Descriptors are entered one at a time.
3. With each entry, there is a pause for a few seconds while the computer scans all of its material. It responds with a number of articles relating to that descriptor. The following numbers of articles were found by Borg and Gall for the example problem:

1. handicapped children	277
2. handicapped students	450
3. self-concept	4,433
4. self-esteem	894
5. elementary school students	5,031
Total Number:	11,085

4. Descriptors can be combined to select only those articles that fit a specific combination. Borg and Gall's example is interested in (1) "self-concept" OR (2) "self-esteem" AND (3) "handicapped children" OR (4) "handicapped students" AND (5) "elementary school students". This combination is entered with the command (1 or 2) and (3 or 4) and (5).

The "OR" increases the number of selected articles by including additional descriptors. Any article relating to either "self-esteem" OR "self-concept" and any article relating to either "handicapped children" OR "handicapped students" will be selected.

The "AND" narrows the number of selected articles by requiring articles to match all the descriptors connected by it. All articles must have either (1) or (2) AND either (3 or 4) AND (5) elementary school students to be selected in this search.

The search above produced only one article reference out of the 11,085 articles identified by single descriptors. The Related Literature section requires more than a single article! The researchers broadened the search by dropping (5) elementary school students. Entering the command (1 or 2) and (3 or 4) produced 41 articles in ERIC documents.

5. Print out abstracts. You can have the computer print out the selected abstracts immediately ("on-line") or you can have them printed out later ("off-line"). The difference is COST! Printing out abstracts while "on-line" means paying the connect fee between the computer and the database while the printer cranks out the abstracts. Printing "off-line" gives you the abstracts in a few days, but cost only a few cents each. This lower cost is possible because the database computer can call the library in the evening when phone rates are low, down-load all of the articles to the library's computer, and hang up. The library computer then prints out the listing. "On-line" printing is expensive, but quick. You get your listing of articles immediately. "Off-line" printing is much cheaper, but you may have to wait 3-4 days before you can get your printouts.

Borg and Gall suggest the most productive results for educational topics would be to search RIE and CIJE from 1969 to date, RIE and Education Index from 1966 to 1968, and Education Index from 1965 back as far as the student plans to extend his review.<sup>1</sup> **Note: This provides a good historical context. Use sources less than 10 years old for the bulk of your study.**

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<sup>1</sup>Borg and Gall, 29

## Select Articles

You now have either citations or abstracts of the selected articles. Citations give the author, title, and date of selected articles; an abstract gives a 50-100 word summary of the study. You want to get abstracts if the database provides them.

You now must find the article. Your library can help you do a computer search and provide you with citations. However, the articles cited may not be in on your campus. You may need to go to a larger university or state school to find the original article. In our area, for example, North Texas State University has over 5 million journal articles on microfiche and adds thousands of articles each year. Make a list of the publications cited in your search. The first step is to find out which libraries in the area carry these publications. The reference desk at area university libraries can provide you with a catalog of publications collected by a particular library. Locate the publications on your list in the directory.

Some libraries have articles bound in annual volumes and stored on shelves. Others record articles on microfilm or microfiche and store them in filing cabinets. Using the library's indexing system, you can locate the full article selected by your key word search.

There are two major ways to process the articles when you find them. The first is to read through the article in the library and take notes on it immediately. Copy down what you think is relevant on 5x8 cards. Be sure to get all the bibliographical information you need for footnotes and references.

The second way is to merely scan the article to determine whether it really pertains to your study or not. If it does, make a xerox copy of it. Both bound journals and microfilm/fiche materials can be xeroxed. The cost is about ten cents per page. You may spend twenty or thirty dollars in dimes this way, but you have a real advantage over the first approach. You have the articles. You can analyze them at home: write on them, categorize them, cut and paste them — the copies belong to you. I heartily recommend this approach -- especially if you have a family who would like to see you from time to time.

Check the bibliographies of the research articles for further references to related literature. This provides you another path to important studies done in your area of interest. Now you must analyze and organize all of this material.

## Analyze the Research Articles

There are several ways to organize the mass of information you have collected. One way is to form a chronology of events or developments related to your subject. Place the articles *chronologically* and look for trends over time. Another approach is to organize the information *conceptually*. In this approach you organize your information in major and minor concepts relating to your subject. A third way is to organize the literature around your *stated hypotheses*.

## An Organizational Notebook

In my last dissertation, I organized my literature conceptually. I began by scanning the 167 selected articles, looking for key concepts and terms used by the authors that related to the key words of my study. I then placed each term at the top of a blank sheet of paper in a notebook. I began with about thirty concepts which were organized alphabetically.

## Prioritizing Articles

While I scanned the articles, I categorized them into three levels of importance: high, medium, and low. High priority articles were identified as those which dealt **directly either with my subject or methods**. Medium priority articles were identified as those which provided either **relevant background information** or important implications of my subject. Low priority articles were identified as those which only **tangentially referred to my subject** or methodology. After my “key word” notebook was organized, I began reading the high priority articles in detail. New concepts were added to the organizational notebook.

## Selecting Notes and Quotes with References

Each time I read something related to one of my key concepts, I recorded it on the appropriate page in my organizational notebook. I was careful to include reference information for each quote. This saved hours of retracing the source of a good quote later. When a key word page was filled with quotes, a second page was added to the notebook. This was done for all the high priority articles. I then analyzed the medium priority articles and scanned the low priority articles. Information drawn from these was added to the concept pages.

## Reorganize Material by Key Words

I now possessed everything in the selected articles related to the major terms in my notebook. As information was added under each key word, the differing viewpoints, definitions, and explanations of the authors leapt off the page! Conflicting opinions were obvious. Schools of thought, formed by groups of writers sharing opinions and collectively opposing others, became apparent to me as I studied the articles in this dissected form.

Further, introductory statements to the articles provided me with quotes and paraphrases for my introductory statement. Historical perspectives, both explicitly stated in articles and implicitly discovered by matching findings with dates of publication, provided background information. Arguments and counter-arguments over definitions and viewpoints gave me insight into the significance of my study.

The very process of pulling information out of articles piece by piece (analysis) and placing it under particular key words transformed 167 research reports into thirty “key” conceptual groupings (synthesis).

## Write a Synthesis of Related Literature

The next step in the process is to refine each of the key word groupings into a narrative. **The Related Literature section is not a list of article summaries**. It should be a flowing, well-structured narrative that begins with the variables you established in your Problem and ends with a question begging to be answered.

Study each key word grouping. How do the various authors define and use the concept? Do they speak for or against the concept? Can you group the authors by differing opinions concerning the concept? Write out, in narrative form, a clear description of how these authors use this particular concept.

Once each of the key word groupings have been analyzed and refined into a narrative, determine what order the key word narratives should take in the Related Literature section.

There are three major approaches to ordering the key word clusters: chronologically, conceptually, or by stated hypotheses. **Chronologically**: If the key word clusters

for a natural timeline of development, a chronological ordering is best. In this case, clusters will be time-sensitive, showing a change in thinking over time. **Conceptually:** If your study is anchored in clear, inter-related concepts, a conceptual ordering is suggested. My last dissertation had sections on the development of ANOVA and multiple comparisons tests, Type I error rate, Type II error rate, power, and research design. **Stated hypotheses:** If you have several hypotheses in your study, these form a natural way to order key word clusters.

### Revise the Synthesis

As in any specialized writing, **revision is necessary**. We *think* we know what we want to say. We *feel that* we have said it clearly. Our thoughts easily flow out of our minds, so we assume they flow smoothly on paper. But this is rarely the case. **All good writing takes time** - building up, tearing down, and building up again. Lay the first draft of the Synthesis aside for several days. Come back to it and read it with an objective eye. You will always find sections that are too brief, or too wordy, or awkward in structure. You will find redundancies, blind spots, and grammatical mistakes. Revise the material and set it aside for a week. **Repeat the process until the material reads smoothly, clearly and tersely**. It should go without saying that you must plan ahead in order to do this. Waiting until just before the deadline is a sure way to produce inferior work. This procedure applies to your entire proposal – but is critical for the Related Literature section.

### Summary

As you can see, the process of developing the Related Literature section of your paper involves a great deal more than checking ten or twelve books out of the library and writing a term paper. The process takes time. You have most of the semester to complete this – but don't wait! Searching the literature will provide you necessary insight into how to mold your entire proposal. Begin now to search the literature. You should do at least one computer search just for the practice of it, and, additionally, it will save you weeks of library time.

### Vocabulary

CIJE	abbreviation for Current Index of Journals in Education (published articles)
Citation Indexes	resources that list articles which cite a given research article reference
computer search	locating research articles by computer
databases	collections of research information by subject matter (e.g. ERIC)
descriptors	key words by which research articles are indexed (e.g. cognitive or children)
Dissertation Abstracts	a resource that catalogs abstracts of all dissertations back to 1860
ERIC	abbreviation for Educational Resources Information Center (CIJE and RIE)
Education Index	a resource that catalogs education information back to 1929
manual search	locating research articles using printed indexes
Measures for Psy. Measurement	catalogs psychological tests used in research
Mental Measurements Yearbook	catalogs published educational, psychological and vocational tests
organizational notebook	tool to aid in dissecting articles and synthesizing related ideas
preliminary sources	resources used to locate articles (e.g. indexes)
primary sources	materials produced by those who conduct research (e.g. journal articles)
Psychological Abstracts	index to over 850 psychological journals
RIE	abbreviation for Resources in Education: index to unpublished materials
secondary sources	materials produced by writers who study research reports (e.g. books)
SSIE	abbr for Smithsonian Science Information Exchange: best for ongoing research

synthetic narrative  
 X AND Y = Z  
 X OR Y = Z

multiple articles broken down and reordered by concept in clear concise writing  
 both X and Y must be true (1) for Z to be true (1); otherwise Z = 0 false"  
 either X or Y must be true (1) for Z to be true (1); both 0? Z = 0 false"

## Study Questions

1. Differentiate among preliminary, primary and secondary sources of information.
2. Define the following terms: ERIC, SSIE, RIE, CIJE, descriptor, SCI, SSCI, database, synthesis.
3. Differentiate between a summary of literature and a synthesis of literature.
4. What is the major difference between printing abstracts "on-line" and "off-line"?
5. Discuss the importance of "revision" in writing your proposal. How are you planning to incorporate revision into your proposal development schedule?

## Sample Test Questions

1. John is interested in analyzing recent unpublished conference proceedings in the field of educational psychology. His best resource is
  - a. SCI
  - b. CIJE
  - c. RIE
  - d. Education Index
2. Two advantages to using the computerized databases to search the literature are
  - a. simple searches and expense
  - b. complex searches and expense
  - c. simple searches and time
  - d. complex searches and time
3. Given 4 descriptors, which of the following will provide the greatest number of articles?
  - a. (1 or 2) and (3 or 4)
  - b. (1 and 2) or (3 and 4)
  - c. 1 and 2 and 3 and 4
  - d. 1 or 2 or 3 or 4
4. Which of the following is not a good way to organize your Synthesis of Related Literature section?
  - a. alphabetically by author's last name
  - b. chronologically by article date
  - c. according to major and minor concepts
  - d. according to stated hypotheses