

Chapter 1

Identifying & Developing the Problem

The Systematic Process of Research

The whole idea of conducting research sounds a bit intimidating to many people. Most of us don't recognize that we conduct and/or use some kind of research every day, in virtually every area of our lives. Most often, it is done informally. When we "check out" the latest CD or engage in comparative shopping to buy a car, we are engaging in some research activities. Even asking questions is a research activity.

The text that follows is concerned with formal research. We will consider how to conduct research that contributes to the professional field and practice of education. Ultimately, the point is that anyone *can* do research, and every professional educator – or any other professional, for that matter – *should* do research.

Becoming familiar with the research process, and all that is involved in it, helps to take the edge off of it. A purpose of this text is to remove the mystery that cloaks research, and pique the interest of those who shy away from it. Once you get to understand it, and the mystique is gone, the magic appears. Research can be fun, and certainly is a powerful tool for professionals.

So where does it start? First, take a look at the Scientific Method of research. *All* research involves the 5 basic components of the Scientific Method. The components are made up of several activities. The 5 components of the Scientific Method are:

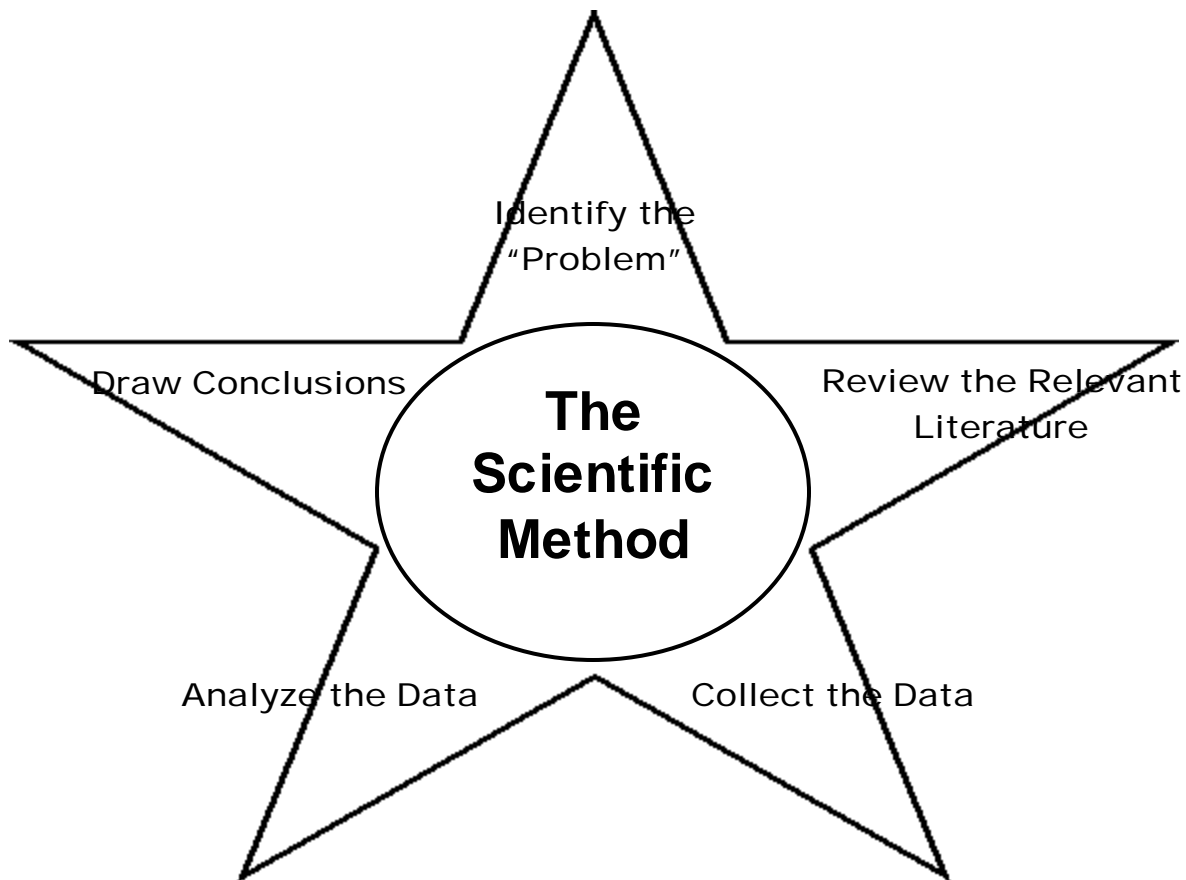


Figure 1. The Scientific Method

In quantitative research, there is a general order to these components. Work your way around the star, beginning at the top. The order is less important in qualitative research, as we will see later on.

The intent is to see that the research is well supported, grounded in objectivity, and based on concrete evidence. If all there is to it is those 5 components, it seems fairly simple and straightforward. Not so! Research activities are where the action is!



Identify the "Problem"

Everybody's got problems, right?! It's the stuff of real life. Problems are not always negative, though. It's important, in research, to think of problems as topics or issues. Having neither negative nor positive energy, the *research problem* is simply a matter for exploration.

Research problems can be found anywhere and everywhere. Professional and personal experience leads to dialogue and discussion with peers and colleagues. A variety of perspectives helps make the research problem concrete, which is necessary before research can actually be conducted.

Review the Relevant Literature

Before going out to research a topic, it pays to know what others have done and said about it. It may be that there is nothing new to discover about a topic or issue. Or it may be that there is little known about it. What have others said? What kind of research has been done on the topic or issue in the past? How has the issue unfolded over time? The researcher must learn as much as he or she can about a topic, before stepping out to learn more. In essence, the researcher must become an expert about the topic or issue before researching it.



Reading the literature is also a part of making the topic or issue concrete, and, further, of narrowing it down. Good research is focused. In order to conduct "good" research, then, the topic or issue being studied must be focused. The research literature helps to define what is being explored, or what it is that the researcher wants to learn about the topic or issue. Reviewing the literature helps to solidify what the researcher wants to know. It also helps the researcher decide *how* to study the topic or issue.

The researcher becomes expert on any topic or issue he or she is studying. Not only is there some experience and input from others behind that expertise, the researcher now knows the literature on the topic better than his or her peers.

Collect the Data

Now here's a component that has a number of activities. It's not as simple as gathering eggs in a basket. Several decisions must be made before the actual collection of the data can begin. The researcher must first determine what research methodology to use, what data is to be collected, what it will look like, who to get it from, and what tools or instruments to use to collect it. It's a good idea to figure out how the



data will be analyzed, in order to gather the appropriate data. The review of prior research will help with those decisions. Practically speaking, this is the component that requires the most resources. The researcher has to be sure that he or she has the money and time required to collect the data. Perhaps more important, though, is ensuring that the researcher has access to the data.

Collecting the data requires that the researcher remain vigilant, paying careful attention to all phases of data collection. In the pages to come, we will explore many aspects of data collection. For now, it is enough to note that Collecting the Data is an active and involved process, and critical to the research process.



Analyze the Data

Now what good do you suppose all that data is? It really doesn't amount to much without analysis. What does it all mean? How does it relate to the topic or issue being studied? What does it say about that topic or issue?

Answering those questions requires that the researcher first organize the data that has been collected. Analysis is generally a matter of mathematics in quantitative research. It may be a simple count, or it may be more complex statistics. In qualitative research, the analysis process may be a matter of inducing meaning or deducing meaning. In any case, the analysis must be undertaken in order to make sense of the data as it is related to the topic or issue under study.



Draw Conclusions

At long last, the end is in sight! Whew! It's been fun, but now that all the data is in and has been analyzed, what can the researcher say about the topic or issue he or she began with? It is at this point that new theories or perspectives are added to the existing body of knowledge. This is when the researcher can expand his or her expertise about a given subject or strategy. The conclusions drawn on the basis of the previous four components have the potential to powerfully impact the professional practice of education.

Well-constructed research should generate questions for further exploration. In a way, the process of research is never really complete. Once we know something about the topic or issue we began with, we will generally find that there is more we want to know. High quality educational practice requires the continual development of new knowledge and new perspectives, new strategies and ideas, and new themes on old ways. Research is a gateway, kind of a conduit to the constant evolution of quality education.

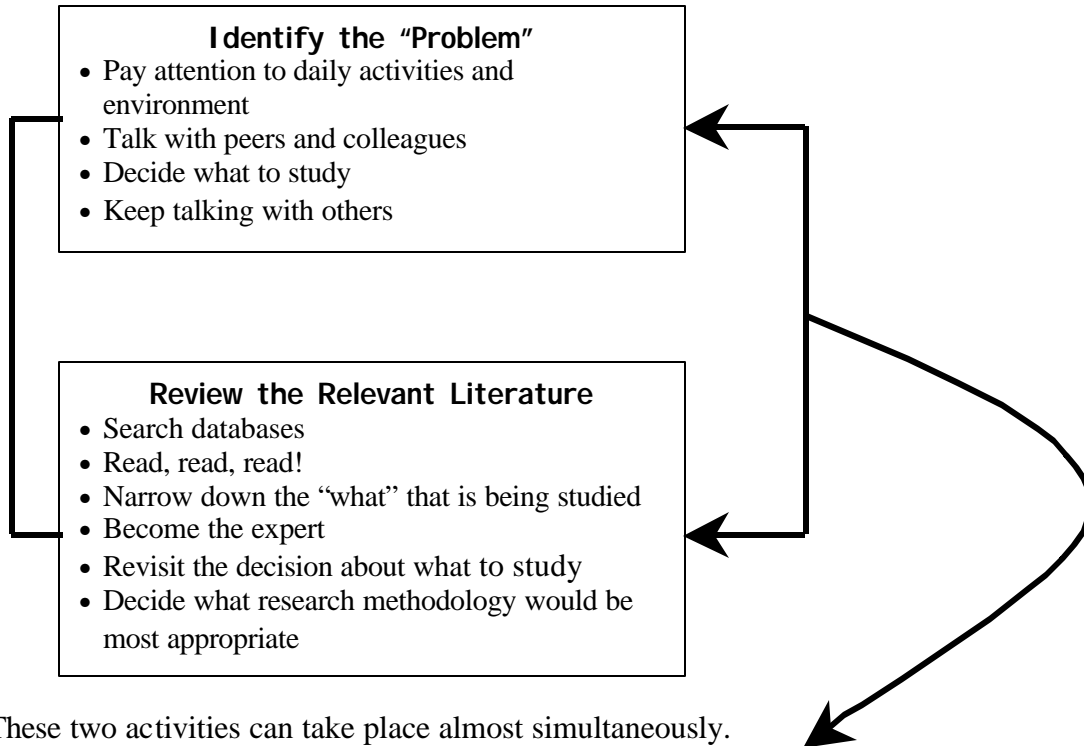
There is a general pattern to these components, as mentioned before. Order is important in quantitative research, and not so critical in qualitative. In either case, though, the process is very generally the same.

General Sequence of Research Activities

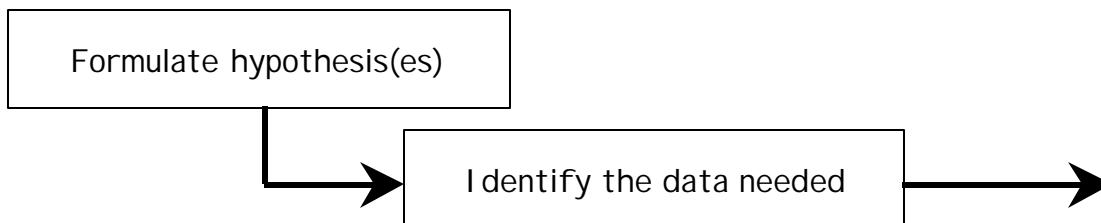
There is a pattern to research! As mentioned before, order is important in quantitative research. The general order is illustrated in the diagram that follows. The diagram also identifies the tasks and activities involved in each component of the research process:

General Pattern of Activities:

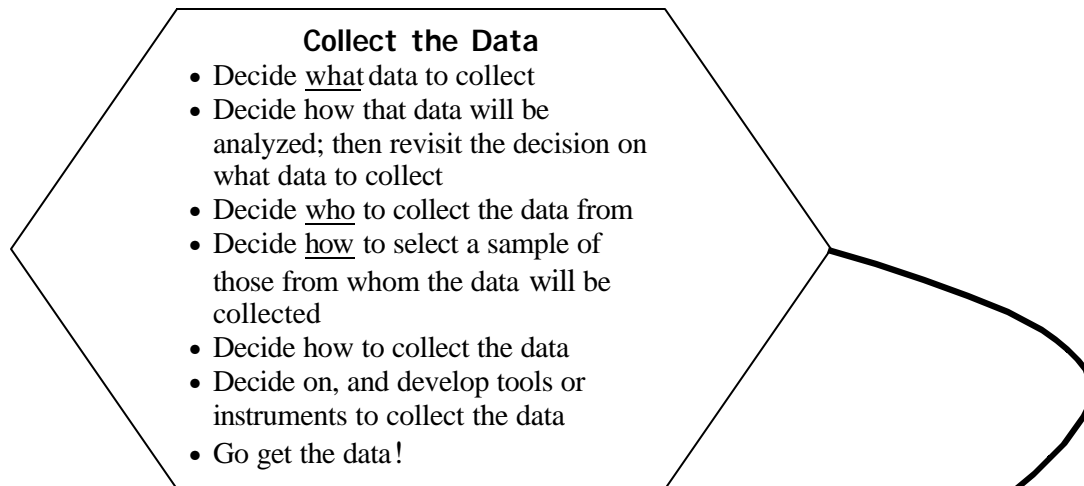
Start



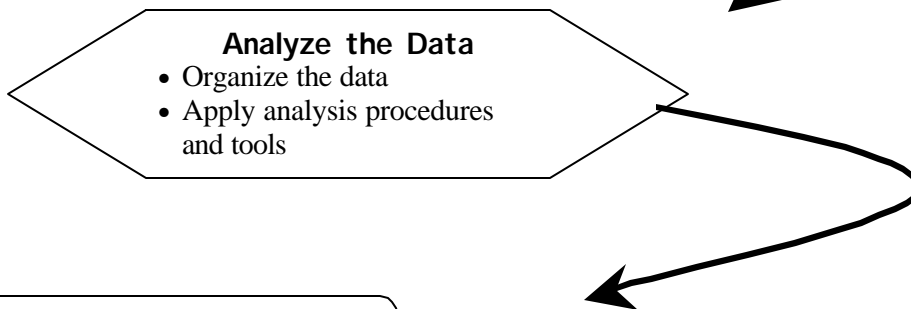
These two activities can take place almost simultaneously.



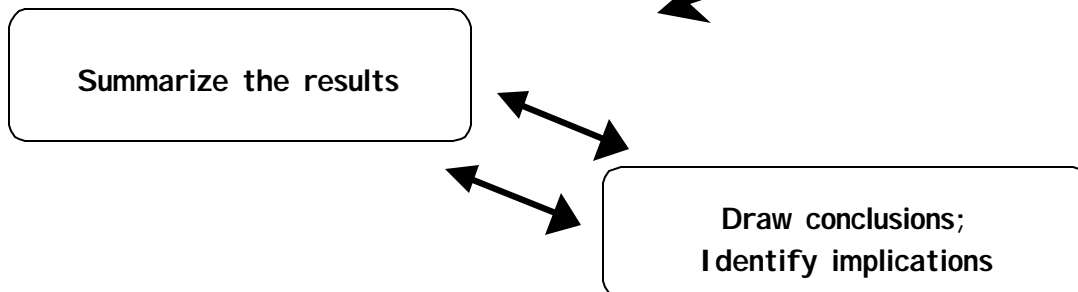
These two activities come directly from the Review of the Relevant Literature. They really are part of that component, but are identified here separately for clarity. Once the hypothesis is known, the necessary data is sometimes obvious. The researcher has many decisions are made at this point.



Though it may look simple, collecting the data actually involves a number of activities.



Then,



Once the data has been analyzed, the results can be summarized. From there the researcher can draw conclusions related to the original research problem, and identify the implications the results have for “the real world.”

Finish!

What implications do the research results have for new theory, knowledge or practice?
What, or how, do the research results contribute to the existing body of knowledge in the field relative to the original research problem?

Chapter 2

Research Problems & Hypotheses

Reviewing the Literature

This process is critical to good research. Generally, it begins when the topic for study is selected. It is important because the development of critical research questions and a possible hypothesis comes from the researcher's knowledge of the research literature. In addition to learning as much as possible about the topic, the researcher is critically analyzing studies that have been previously conducted. Such an analysis is important to equip the researcher with enough information to know how the issue appears in the "real world."

CRITICAL ANALYSIS OF THE RESEARCH LITERATURE

The researcher must view the literature with a critical eye. Not all published research is useful! Of course, that depends on what is currently under consideration for study. The researcher must inspect the literature for its:

- Completeness
- Relevance to the current topic or issue
- Soundness relative to research design
- Application to the "real world"

Begin with an overview of what literature is available. A review of the many available databases is a good place to start. The Internet has introduced a wide variety of search possibilities. The researcher must be careful to select literature that is salient, or gets to the point. However, the search should not be confined to only that literature that is directly on point. Topics that are related to the one under consideration should be explored as well. Here's an example of a diagram that may help to identify related subject matter for reviewing the literature:

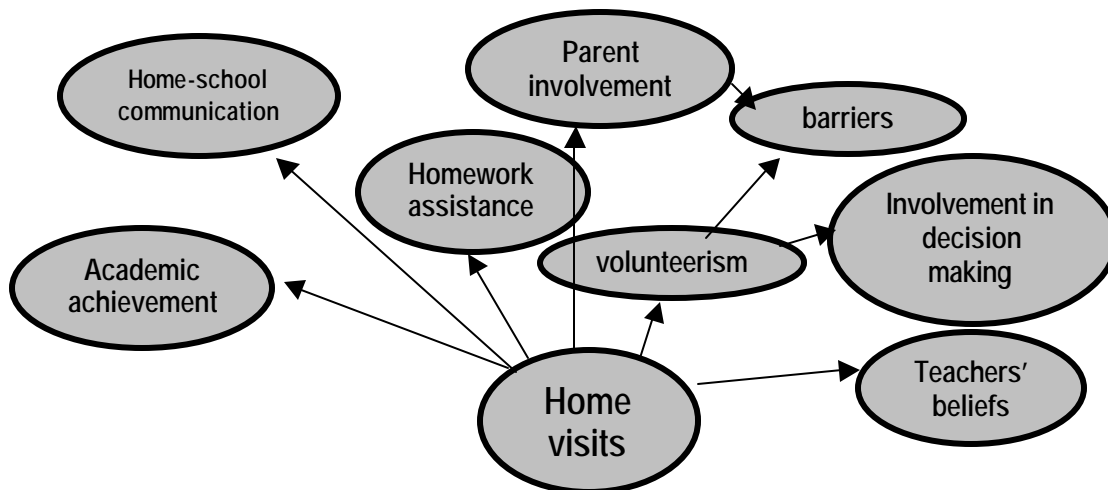


Figure 2. "Tree" Diagram

In this case, the topic for study is Home Visits, where educators visit the homes of students. As can be seen from the many subjects that are related, this is a pretty broad

topic. Narrowing it down could be tough. The related subjects, though, give the researcher some ideas about what to pursue. Perhaps the researcher wants to focus on the academic impact of Home Visits. So he or she might then peruse the literature that covers what affects the academic achievement of students. That may lead to a clearer understanding of whether or not Home Visits could be a factor in students' academic achievement.

That should give you a rough idea of how to go about reviewing the research literature. So what do you do when you identify a study that you want to review? Read with a critical eye! Here's a checklist to help with your critical analysis of the research literature:

Abstract

This is the author's description of the study. Is it related to your area of interest? Are the conclusions relevant to the topic being considered?

Statement of the Problem

Here is where the author restates the topic. Ask yourself, Is the problem stated clearly? Is the purpose of the study clear? Can you identify the significance of this study to your area of interest and to your professional field?

Hypothesis or Research Question(s)

Not all published research will include a hypothesis statement, or even a list of research questions. But if the study does, are they clearly stated? Are they relevant to the study you are reading? Are they related to your area of interest?

Assumptions

All research emerges from assumptions about the "real world" that the author made. The researcher must determine whether those assumptions are explicit or implicit. What is being assumed? Are those assumptions similar to yours?

Delimitations

This term refers to decisions made by the author(s) about how to narrow the study. It may include other considerations, such as access to subjects and data. The author should discuss how those decisions affected the credibility of the study (validity & reliability). The researcher must ask, How was the study narrowed? Which considerations raised by the author are relevant to the current study?

Definitions

Identifying key concepts and terms used in the study can help extend the researcher's knowledge of the topic or issue under consideration. How is the author using language? How does the author define abstract terms? It's important to know this, in order to have clarity about the author's intent, and the meaning of the data analysis and interpretation.

Method

Here, you get down to how the study was conducted. Can you identify in the article the research design? What population does the study apply to? How is the sample described?

How was the sample selected? How was the data collected? What data was collected? Does the author clearly describe the procedures by which the study was conducted? How was the data analyzed?

Findings

Now that you've read the study, do the findings make sense? What do they say about your area of interest?

Discussion

Is the discussion of the findings presented clearly? Do you find the author's interpretations meaningful? Are implications for the field discussed? Does the author make suggestions or recommendations for further study? Are limits to practically applying the findings raised?

Conclusion

So, what did you learn? What do you now know about the topic or issue under consideration that you might not have known before? What new information or perspectives do you now have that might influence your identification of the topic or issue you intend to study?

Apply these thoughts to each article you review. It may be that after reading through the abstract, you find that a given study isn't relevant or useful to you. Skip it! Move on to the next one. When have you read enough? That's up to the researcher. You have to make a decision about when you believe you know enough to develop a statement of the research problem, articulate research questions, or state a hypothesis about the topic.

The Review of the Literature is so important that a more in-depth discussion of how to approach it, by Dr. Susan Wycoff (2001), follows.

The Pragmatics of Research: Developing your Literature Review

Any research that is proposed requires a foundation from the published literature and existing scholarly work on whatever topic has been selected for study. An intensive literature review usually begins in the early stages of research and continues at a reduced pace throughout the remainder of the research process. A preliminary review of related literature is undertaken to determine what has been done concerning the question or problem you have selected. It is necessary to find out if a solution or response already exists in the literature. If adequate information is located that solves the problem or answers to the question(s) you have posed, there is no reason to continue the research project. However, if you learn that your proposed research question or problem is not adequately answered in the existing literature, you may decide that the preliminary review of the related literature should proceed. Mindful questions a researcher should ask him or herself during throughout this process include:

- *Has my research question or problem been identified previously?*

- *If so, what information has been published ?*
- *Does the absence of information in the existing literature mean that the topic has not been investigated before?*

The review of the related literature is a unique process that has two partially overlapping purposes. First, the literature review serves as a springboard from which the researcher develops a unique research question. Second, the literature review is not simply a compilation of facts, but a persuasive argument that leads to the description of one's proposed research study. At the end of a well-developed literature review, there should be no question about the direction in which you are going. Any person reading your work should be able to conclude that your study is exactly what needs to be done at this moment in time for the purpose of moving the field of education (knowledge or practice) further along.

Once the relevant information has been found and read, it must be summarized, evaluated, and stored so it is readily available when needed. You will need to develop a reliable and systematic method for recording notes taken from the literature you will be collecting. Memorizing or taking copious notes on every article published in your area is not necessary before starting to write your review. Creating a solid plan often requires return journeys into the literature addressing such matters as measuring instruments and procedures for collecting and analyzing the data. Experience suggests that you may need to read the literature you have collected at least twice, but in different ways. Initially, you will need to review the literature to learn about the key issues in the field and to decide what material is relevant and how to organize it. Following this, you should read the selected articles and chapters again as you write the actual literature review and realize that you need to know more about what particular authors did and found.

As you are collecting your literature, read it critically. Remember, you are going to synthesize this information into a coherent review that highlights the main themes, strengths, and weaknesses of the existing work related to your research topic. One of the aims of your work is to deepen or improve upon the existing body of work in your professional field or in a particular area. Start thinking about how you will organize this literature in your review. Look for common themes and divergent patterns in the methodologies and conceptual frameworks used. The body of the literature review will be divided into sections. Each section will cover one aspect of the literature review. This allows you to maintain organization and flow. Make certain that your headings convey enough information to assist and orient the reader to the material that follows. Begin your literature review with a brief introduction. The introduction should do just that: introduce and make a pitch for the topic, introduce key concepts and terms, and describe the scope and organization of the review. A good way to end the introduction is with a paragraph that lays out the scope of the literature review.

Do not be surprised if some of your sources will at first appear relevant and later, be found not to be applicable. This is part of the developmental process inherent to research. The literature review should be a flexible process. As such, it is subject to change; and eventually, you may or may not decide to use each and every reference you have

collected. Expect to identify and photocopy more sources than you will ultimately use. However, be aware that you will rely on this material when pursuing leads to further resources as you complete your review. Write down your observations to keep a record of them. If these observations characterize much of the literature, they may lead you to some major insights about your own topic.

You probably will not cite every article you initially photocopy. Despite the initial expense, you are encouraged to photocopy pages of articles and chapters primarily because you never know when you will have to return to an article to locate a specific detail that you failed to jot down in your notes. If you plan to continue doing research around the topic you have selected, photocopies provide a good beginning personal library that you will use regularly. However, if you decide to go the more frugal note-taking route, be sure to include complete details in your notes (e.g., author's name, journal title, year, volume, etc). One idea is to develop an annotated list of information about every article you read (e.g., number and characteristics of subjects, independent variables, etc.). You can even systematize this into a prepared spreadsheet on which to record specific details from each study. Details that do not seem important now may become very important later as you try to reconcile incongruous findings and search out potential confounds in previous studies. Additionally, if you choose to omit studies to keep the length of your review manageable, let the reader know your criteria for inclusion or exclusion and why you selected them. For any portion of the literature review, it is essential that all pertinent information be carefully recorded. This includes the title of the journal article or book, the name(s) of the author(s), the journal title if the publication is an article, the date of publication (including year, volume number, month, and date when appropriate), the page numbers, the publisher and location, and any other information required for accurate references cited as a part of the research proposal or final report.

IMMUNE YOURSELF AGAINST THE WRITER'S VIRUS

Don't be surprised if you come down with a case of writer's block. This affliction affects many students, even those who regularly produce research papers with little difficulty for class assignments. Sometimes this malady results from the mistaken notion that your review must be perfect. This is an irrational or faulty belief that tends to result in self-defeating behavior. Most students will hand in and revise several drafts before they are finished. No matter how polished your work appears, your instructor will have suggestions and anticipates that your first draft will need work - like every other student enrolled in your class. It is impossible for your draft to be perfect, so allow yourself the room for improvement. Remember, your role throughout this process is one of a student, which means this is a learning experience. Another common affliction that causes students to passively sit before a tablet of paper or the computer screen for hours occurs when they begin to write. This comes from the mistaken notion that one must begin at the beginning: write the introduction, and then proceed in a sequential manner.

If you find it hard to start with the introduction, start with a section that comes more easily. If the thought of developing a paragraph fills you with anxiety, sketch out the ideas you want to cover first and then build paragraphs around them. The point is to write whatever you can, because tasks that seem impossible in the very beginning will be much

easier at a later stage. The good news is that it will be much easier to revise your work once you have actually written something to revise. Remember, a thousand mile journey begins with the first step. By any means necessary, put one foot in front of the other. Ultimately, it is more important that you get started writing -anything- than completing sections one by one in a dogmatic order. If a 25-page literature review is too overwhelming to fathom, set small goals for yourself that have tangible outcomes. Moreover, remember to reward yourself as you accomplish each outcome goal:

- ☺ "I will write for 2 hours this morning, and then treat myself to an espresso."
- ☺ "I will write one page today, and reward myself by watching my favorite soap opera."
- ☺ "I will develop one sub-section this week, and treat myself to a massage."

This positive reinforcement has the potential to motivate while increasing your ability to work more efficiently. Small-scale outcome goals will help you see tangible progress and ultimately lead to a finished product.

THE SHERLOCK HOLMES METHOD OF PLANNING A LITERATURE REVIEW

Here are some suggestions to consider when formulating and planning your review of the related literature:

Computerized Databases: Computers provide valuable ways of searching literature quickly. ERIC, covers education, and related literature. If you have access to a large library, ask the reference librarian how you might use these systems. A user fee may be required. To use these resources well, you will have to learn how to execute computerized database searches. Although search programs differ, most have similar characteristics. First, you must locate *keywords or search terms*. These are words and phrases that describe the contents of journal articles, book chapters, etc. The computer then lists abstracts that contain all the words you have listed. You can scan results of searches on the computer screen, print them, and (sometimes) download them to your hard drive or a diskette.

Finding the right keywords is the key to a successful computer search. This is by no means easy since not all investigators use the same jargon to describe their research. Moreover, some databases have professional indexers select the terms by which the article will be indexed. One excellent way to locate good keywords is to find some articles in your topic area and look in their abstracts and references. Words that show up frequently are good possibilities as keywords. In addition, some journals list descriptors by which a study will be indexed. Also, consider consulting a thesaurus to locate comprehensive categories associated with your keywords. An inherent weakness when conducting computerized searches is to believe you have done an exhaustive literature search. The problem is that the search is only as good as your keywords; the breadth to which writers and indexers in the field use the same words in their titles; the range of journals each database contains; and the number of years covered by the database.

Because of these limitations, students are encouraged to supplement their literature search with other methods described in this section.

Identify Experts in the Field: Who among your friends, acquaintances, or people you have had recent contact with would be most likely to know where you might find resources related to your topic? These individuals may be experts with helpful knowledge. Share your ideas with people who have relevant interest and knowledge, and ask them where you might find published material. Perhaps you recently completed a course that included related material? If so, ask the instructor. If you work in a school or an agency, consider colleagues' special interests and areas of expertise. If you are an educator or future school administrator, find out if your school district office contains a clearinghouse.

Scan Journals and Books: As you become more familiar with your research topic, identify the journals in which most articles in your area have been published. Additionally, scan relevant articles, paying particular attention to their tables of contents and references for the last 2-5 years. These methods will help you find articles that may be too recent to be identified in reference and bibliographic materials; and are invaluable sources when your other sources may not have turned up. **Caveat:** most researchers in a particular area have informal interpersonal and journal networks. As a result, they tend to publish in and cite articles from their journal network. Consequently, this may lead to an overrepresentation of articles from inside the journal network and an under-citation of scholarly support outside the "encapsulated" journal network. This is yet another argument for using multiple methods to conduct a comprehensive literature search in your research topic.

Books: Look over the textbooks you have used in recent courses or related materials that have come to your attention. If a book gives even brief attention to a topic related to your proposed research, it may cite a reference. If you identify a relevant book, locate it in the library. Examine other books on the same shelf. Libraries use the Library of Congress catalog system whereby books with similar call numbers have related content. The "subject" catalog in the library will more than likely reveal other books relevant to your topic. For recently published books, examine the reference list to locate other materials you can use.

Professional Journals: Find several recent issues and scan the table of contents in each issue for articles related to your research. Some journals have a subject index covering all of the articles published annually. When you find a good article, look over its list of references to locate other materials you can use. Keep in mind that your research area may overlap with other disciplines. Educational psychology, school counseling, pediatric medicine, nursing, communications, social work, and sociology all have professional journals that publish articles relevant to some areas of education. Many disciplines have printed abstract services you can consult to learn if your research topic is addressed by more than one discipline.

Abstracts, Indexes, Annual Reviews, Monographs, and Clearinghouses: Abstracts and Indexes are usually housed in the reference section of large libraries. Most cover large segments of the professional literature, and include both author and subject indexes. Keep in mind that students are often prohibited from checking out these items. Annual reviews and monographs contain several chapters that review the literature on similar or dissimilar topics. Topics tend to vary from year to year. Although both contain helpful and relevant information, the references cited will probably not include the most recent published works. Additionally, many government agencies at federal, state, and local levels publish reports related education. You are most likely to find these materials at large libraries that house government publications. If you are unable to locate these publications in your library, U.S. senators in your state, congressional representatives, and state legislators from your district who have local offices with staff should be able to apprise you of activities related to your research topic. If you find an item you can use, ask for a copy; if it is not available from the legislator's office, ask how you might obtain it. You may even be able to obtain "cutting-edge" information, pending legislation or reports from these governmental committees and agencies.

Professional Conferences: Most large professional organizations, and some smaller ones, hold annual conferences in which professional issues are discussed and information is exchanged. All content presented in conference sessions is part of the professional literature whether or not it is reflected in a documentary record. Conferences may audio or video record presentations in their entirety making them available for distribution or purchase to attendees. Also, you may be able to get a copy of the work shared at the conference by writing to the presenter or accessing it via a database.

Avoid Using Items From the Popular Press: *Tigerbeat Magazine*, *Newsweek*, the *New York Times*, and the *Ladies Home Journal* frequently publish articles related to youth, students, and education. These and similar forms of entertaining magazines may be excellent ways of gaining daily knowledge of what is happening in the world, but they are no substitute for scholarly works published in peer-reviewed journals. Although the information in popular magazines may be accurate, you cannot evaluate them as you would a journal article in which the methodology used to collect and analyze the data is clearly delineated, for all to critique. However, if you come across a magazine or newspaper article that you really feel is important to your topic, and if it is written or cites the name of a prominent person with expertise related to your research topic, look up the name of the person in the author index of *Books in Print*; you may find one or more of their books.

Requesting Reprints and Preprints: Visualize this: *You have just found the "perfect" reference to use in your lit review. You travel down to the bowels of the university library basement, only to learn that your library does not subscribe to that particular journal. What to do?* Given sufficient time, you may be able to obtain needed journal articles and books through interlibrary loan or by direct order from the author or publisher. Once you have identified key research in your area, pay a visit to the interlibrary loan department located in your campus library and submit a written request for a reprint. If this is not available, consider writing to the author(s). Ordinarily, they provide copies of journal

articles or book chapters for the asking, and you may find that they are more than delighted to discuss their research with you. If an item you need is *"in press"* (work that has been accepted for publication), you may contact the publisher and request a *preprint*. If you are in a hurry, a telephone call or email may be more effective than a formal letter. A call or email can also prompt a quick response; sometimes it's harder to ignore a request from a person with whom one has spoken than from a letter in large stack of mail (*remember the absent minded professor?*).

Primary vs. Secondary Citations: Literature used for research studies can be classified into two categories: primary and secondary. Primary sources are those prepared by a researcher who was involved in the activity being reported or actually observed. Secondary sources are those that have been prepared by the researcher or author using previously written materials or reports from others who did not actually participate in the research activity nor observe the actual events that were being reported. Primary sources should be used whenever possible; although secondary sources may be used when primary sources are not available or no longer exist.

If you cannot find the original article because it is in an obscure journal or if it was presented at a professional conference but never published, do not cite the article as though you actually read it. Instead, follow the writing guidelines of your profession to indicate the citation of a secondary source (e.g., "Mertz, 1999, cited in Ricardo, 2001"). Neophyte researchers are encouraged not to rely on others' descriptions of studies and their findings (e.g., secondary sources). All too often, elements of the original work and intent get lost in the translation; as researchers cite studies erroneously, by stating that the authors said something they did not say or did something they did not do. Look up the original articles and read them yourself. Now is the time for you to build an intellectual foundation for yourself, drawing your own independent conclusions. This is accomplished through the rigor of academic discipline.

WHEN CAN I STOP COLLECTING ARTICLES AND PHOTOCOPYING?

A frequent question among students is, *"how will I know when I'm done collecting articles and other materials?"* The rule of thumb is, you can determine where and when to stop your literature review when the articles you read become redundant and when the articles that are cited become familiar to you or keep showing up as citations. Your search is over when you have done all of the above and you continue to turn up the same articles, over and over, as you look at others' reference lists and bibliographic sources. Understand that this may not mean you have done an exhaustive search, or collected everything ever written on your selected topic, but it does mean you have probably found the major articles produced in the area.

Research Problems, Questions & Hypotheses

Research Problems

All research begins with an idea or a question. It starts in generalities and narrows to specifics. The process is kind of global at first; that is, it starts with a general question or topic of interest to the researcher. It may be that personal or professional experience in the field of education leads to questions about something. Or, perhaps you read something in the newspaper that piqued your interest. Maybe you've come across something in your studies in other courses that has caught your attention. Your topic may come from conversations you've had with colleagues or the parents of your students. At this point, though, you should begin to peruse the research literature related to your interest. The process of narrowing is aided tremendously by searching the literature.



What you learn by reading some of the literature, or even by searching for it, will help you to begin to formulate concrete, specific questions about your interest. That, in turn, leads to defining a specific “problem” to be explored. Remember! *A Research Problem is not necessarily a “problem”!* The use of the word “problem” should not be considered as negative. In other words, you won't always be looking at something wrong. You may be interested in learning how to make what is already good, better. And, you may very well be seeking answers to issues or concern about education that are considered problems.

The problem should be one in which the solution will make a contribution to the field. That may be a contribution to the body of knowledge that already exists about education. It may confirm what is already known; for example, early theories about learning may be confirmed under contemporary conditions. It may expand what is already known. A handy example is Howard Gardner's multiple intelligences theory. It both adds to existing knowledge about learning, and expands on, or extends, it. Or, the problem may challenge what is already known.

The researcher should avoid selecting a problem that is obvious in its irrelevance. For example, the problem of whether 5th grade boys prefer using pencils, ballpoint pens, or crayons to take spelling tests is somewhat trivial and probably irrelevant to the academic achievement of those boys!

No research problem is an end unto itself. In other words, the problem should lead to further inquiry into other related areas. Undoubtedly, as the research progresses, new questions or issues will arise, and should be set aside for future inquiry. When the researcher draws his or her conclusions, those questions or issues should be described and recommendations made for their exploration.

Of course, when developing a problem statement, the researcher must take care to make it one that can be researched. Questions like “What is the meaning of life?” probably isn't good for much more than perpetual pondering!

The problem should be one that can be researched under conditions that are feasible for the researcher. The primary question is whether or not data is available to be gathered. For instance,

data about the hygiene habits of the parents of high school students in France is not particularly accessible for most locally-based researchers, so a problem requiring that data is not very feasible. On the other hand, a high school English teacher who is interested in the reading habits of his or her high school sophomores would probably find that data very accessible.

The identification of what is to be studied should result in a concrete description that precisely defines the topic or issue of concern. Precision is important! The researcher must narrowly describe what is being studied. Without precision, the study can wander to related issues or topics fairly easily. All research raises more questions; without a precise and narrow description of what is being studied, the data and its analysis can be misinterpreted and misapplied to address other questions or issues raised.

The research problem, then, . . .

- Identifies the variables to be studied;
- Asks about the relationship between 2 or more variables;
- Is clearly and concretely stated;
- Doesn't represent a moral or ethical position.

Here's what it may look like:

Example:

"It is the purpose of this study to determine whether participation in an after-school program leads to academic success."

In this example, "participation in an after-school program" is the *Independent Variable*, and "academic success" is the *Dependent Variable*. The statement of the research problem describes what will be studied, and identifies the variables. It poses a question about the relationship between the two variables, is stated clearly, and doesn't represent any particular position.

Okay, your turn. Develop two or more research problems you are interested in studying, and write them in the space provided. Identify the *Independent* and *Dependent* Variables.

Hypotheses

A "hypothesis" is a conjecture, or a suggested "answer" to the research problem. It is basically the researcher's best educated "guess" about the relationship between or among two or more variables, or the nature of the issue or phenomenon to be studied. More specifically, the hypothesis. . .

- Suggests the direction, or nature, of the relationship between 2 or more variables
- Should be stated as a declaration

- Should be “testable”

Ideally, the hypothesis should derive from the description of the research problem. It doesn't always happen that way, but the researcher should be able to propose a hypothesis or two about the research problem, after becoming the “expert.”

Here's what it may look like:

Example:

“Students participating in an after-school program will have greater academic success than students who do not participate in such a program.”

In this example, the phrasing is different from that used in the *Research Problem*, but the Independent and Dependent variables are the same ones identified in the Research Problem. You'll note that it proposes the nature or direction of the relationship between the two variables. It is stated in declarative form, and is clearly testable.

Now, you try it. Using the research problems you have stated, develop a hypothesis for each one in the space provided. Identify the Independent and Dependent variables.

Relationships Among Variables

The diagrams below illustrate how the variables relate to each other, between the research problem to the hypothesis:

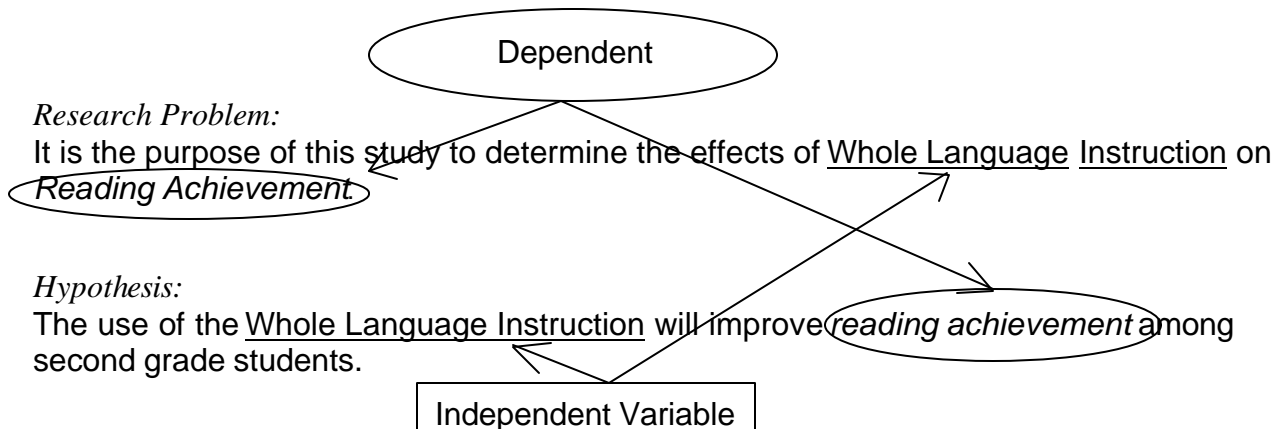


Figure 3. Diagram of relationship between Research Problem and Hypothesis.

This is, of course, a very simple example. From this, you can see how the Hypothesis may be derived from the Research Problem. Try it yourself, if you haven't already. Develop a Research

Problem, and then, draw from it, a Hypothesis. The inclusion of the identification of the variables is here to illustrate the relationship. For more about the variables, see the *Familiar Terms*.

Research Questions

Now the researcher should get more specific. Exactly what questions does the researcher have about what is being studied? What “answers” are sought? Research questions help to detail more concretely what is being explored. Using the Hypothesis above, here are some specific research questions that might be “answered” in the study:

- How much will Whole Language Instruction improve reading achievement?
- Can Whole Language Instruction be considered an effective methodology to teach reading?
- Is Whole Language Instruction a better methodology than, say, phonics instruction for second grade students?

Focusing on these questions will help the researcher interpret the data, and make recommendations for the application of the study results. You’ll notice that the questions are closed-ended, or require finite responses. That doesn’t really yield much information. The study is made richer if the research questions are open-ended:

- How does Whole Language Instruction affect reading achievement?
- How do second grade students respond to Whole Language Instruction while learning to read?

Hopefully, you get the idea. Clearly, the open-ended questions require more information, which makes the discussion and interpretation of the data more meaningful, and, ultimately, more useful.