538/598 Project Design
(see examples http://teaching.up.edu/edresearch/projects.html)

Note that in each section (chapter) there are suggestions for things to do and suggestions for how to write about what you have done. APA writing suggestions are listed at http://teaching.up.edu/edresearch/apa.html

Chapter 1: Identifying something to study (Introduction)

Selecting a Problem

What is going on around you that needs some attention? Where could you address a problem if you knew more about it? Is there a problem where one solution you have tried didn't work? For example:

- An educational phenomenon you wish to describe (move from a middle school to a junior high; change in curriculum; effects of block scheduling).
- An event you observed and will attempt to explain (why some students have trouble with long-division problems; ease of problem-solving; variety of writing strategies used by high achievers).
- A problem for which you will develop and try a solution (how can I make my students more self-directed learners; how can I get non-volunteers to answer questions)
- Replication studies (check the validity of research findings across different populations; check a new finding; check important findings using different methodologies).
- Have you read or heard about something that you would like to try out in your own classroom or school?
- Sources of good questions might be: Problems you are having doing what you want in your classroom or school.
- Listen at faculty meetings or committee groups for problems that need addressing.
- Look in research journals for ideas. Pay particular attention to conclusion and implications sections.
- Look at hot topics in your district or education in general (reading instruction; inclusion, standards based testing).

Here are some gauges to think about while you are selecting a problem on which to work.

- Is it interesting? You are going to be working on this for some time.
- Have others written anything about similar problems (your first step into the literature)? A caution here. Many students experience difficulties when they first try to find literature on a topic. This does not mean that literature does not exist on the topic but that they are having trouble finding it. Ask for help (your instructor, reference librarians, your colleagues).

- Is it significant? Will it help you or others do your jobs better (practical significance)? Will it add to our knowledge about education in some important way (theoretical significance)?
- Do you have the ability to investigate this problem (resources, time, know-how)? You may not know the answer to this question until you start working on the problem for a while. You may have to adjust your problem as you realize what it is that you can get accomplished.

Writing a problem statement (see Problem Statement Worksheets)

Start the statement with, "The purpose of this study...." Write for clarity—avoid technical jargon or complicated grammatical constructions. Usually in qualitative studies group, setting, and topic are included in the problem statement. Usually in quantitative studies group, characteristics to be compared, and intervention are included in the problem statement. You make your research work much more complicated if you intend to address more than one question in a study. Therefore the word *and* seldom appears in a problem statement.

Writing an Introduction (3 to 5 pages minimum)

An introduction is a narrative in which you make the case that your research question is worth asking. Usually the introduction includes a description of the context in which the question was raised, some history of the problem, what theoretical constructs (ways in which the research community views the problem) have been applied to the problem, and some discussion of what you intend to find out and why that would be important. Because the introduction is the case for asking the research question, the research question is usually, but not always, presented at the end of the introduction.

To write an introduction develop a logical argument, usually with 4 or 5 steps, that leads to the problem statement. Then expand each of the points of the argument to a paragraph or two. An example might be:

- A number of national organizations have called for integrating problem solving into science curricula.
- This is difficult to do in an era of standardized testing.
- Some evidence exists that problem based curricula may be able to support problem solving and the attainment of basic science knowledge.
- Concern remains that students in problem based learning environments will not do as well on standardized assessments.
- Therefore, the purpose of this study is to examine changes in student achievement on standardized assessments after a problem based science curriculum is implemented.

Chapter 2: Finding out what others have written (Literature Review)

Outline what needs to be reviewed.

If you don't do this inevitably you will include reviews of studies that are not relevant to your study. Develop a bibliography—annotated tend to be more useful. Gathering bibliographic information directly into a computer will make your work easier.

Gather materials.

The process of gathering information may affect your problem statement because you will be finding new information about your topic. Sometimes you will want to rewrite your problem statement after you have done an initial literature search. Use the work of others (see worksheet on finding literature). There is nothing unethical about using the work that others have done as long as it is cited. This includes literature review work.

Writing a Review of Literature (usually the longest section of your paper)

Summarize the literature that you have read. Use your outline. The focus of the literature review is the findings of the studies you are reviewing. Often you will need to describe the methods of the study as well. Be humble when critiquing method and/or content of studies you have read.

Show the relationship to your study.

Your conclusions will be based on this relationship. A good literature review leaves the reader feeling informed about the topic, knowing enough to decide if you have proceeded appropriately, and believing you have supported all of the points you will make. Often literature reviews need a few summary paragraphs at the end help the reader know what of your review is of the greatest importance to your particular study.

There are generally two approaches to literature reviews

1. Identify main ideas, referencing all appropriate documents. Example: Combining group and individual assessment in cooperative learning is a critical component (Johnson & Johnson, 1972; Slavin , 1983; Wilcox, 1990).

2. Review the content of specific important documents thoroughly and then show the relationship among them. Example: Johnson & Johnson (1972) studied assessment strategies for cooperative learning and identified combinations of group and individual assessment as most beneficial. Slavin (1983) expanded this work and demonstrated the need for particular emphasis on the individual assessment component. Wilcox (1990) showed equal importance of both assessment components but suggests the assessment design will significantly affect the quality of the gathered data.

Chapter 3: Deciding how to collect data (Methodology)

All four of these have to be done simultaneously. In qualitative studies these may change over the course of the study.

1. Decide precisely what is going to be studied. Operationalize variables (quantitative).
2. Decide precisely who will be studied. Define population and sample (who will be studies and who are they intended to represent?) Define sampling procedures (how did you select who you did?)
3. Decide precisely how to gather data. This includes selecting and gathering the instruments to be used or, if need be, building your own data gathering tools
4. Decide how data will be analyzed.

Writing a Methods section (most of this will go in the IRB)

Subjects (only include pertinent details—details that directly related to the study).
Describe the population and sample.
Describe the environment of the study.
Describe who will be included in the study and why. The reasons for inclusion are likely to be substantially different for qualitative and qualitative studies.
Measures: Describe the instruments used and for what purpose. Describe how they were developed and what you know about how good they are (validity and reliability)?
Procedures (future tense for proposals and past tense for final papers): This is where readers of your work will come to see if you have done your study well. It is good to be fairly specific in this section. Describe how the participants in the study were selected. Describe how you intend to use the data gathering tools you have selected or developed. Describe how you intend to analyze the data once it is gathered.

Chapter 4: Collect and Report Data (Results)

Administer the instruments to your sample. Collect and code the data. Use the tools of analysis that you have selected.

Writing a Results Section

In quantitative studies, objectively, accurately, thoroughly, dispassionately describe the data collected. Describe the data in written form and describe the data in some graphic form (table or chart). The text and graphic descriptions should accurately match. Describe what happen to the data when the analysis tools were applied.

In a qualitative results section the data are reviewed to identify themes and specific examples of each theme are presented. Often some analysis of the categories is included also.

Chapter 5: Decide what you discovered (Conclusion)

Compare the data to what you thought you would discover. Compare to your research question. Compare to what you found in the literature.

Writing a Conclusion Section

- Describe your interpretation of the results you described in the last chapter. Base this on the comparisons you made above—comparisons to your research question and to the literature. (In some studies this is called a discussion section.)
- Describe what this means for the population (sample) who was studied. If appropriate describe how you might apply your new knowledge.
- Talk about problems or limitations of the study. Describe what further studies might address moving beyond what you found.
- Conclusion/Summary—bring closure to the paper. Often this is a paragraph or two that describes the importance of this work for you specifically (how this will impact your classroom or school) or the importance of this work for education broadly.