

## How to Write a Successful PhD Dissertation Proposal

Before considering the "how", we should probably spend a few minutes on the "why." The obvious things certainly apply; i.e.:

1. to develop a roadmap to follow during your dissertation project,
2. to facilitate feedback from your advisor and your committee as to the validity of your problem and the efficacy of your approach,
3. to establish a point of departure that will be flexible enough to withstand revision in light of the inevitable "surprises" that will crop up as you progress through your research program, and
4. to gain experience in writing research proposals.

At least as important as any of the above, however, is the need to convince your major professor (and perhaps your advisory committee as well) that your topic is important enough to fund and that you have a reasonable chance of completing it successfully. All faculty, regardless of the source of their funding, are under pressure to produce results (specifically publications) pertinent to the objectives of the grant funding your project. For them to risk their money in support of your project you must successfully argue that:

1. the objectives of your project are important to the objectives of the grant(s), and
2. the chances of a successful outcome are very good.

How do you do that? Well, that brings us back to the original question: "How do you write a successful dissertation proposal?"

### Fundamental Elements

The fundamental elements of a good dissertation proposal are not very much different from those of any good piece of scientific writing. These generally consist of some or all of the following: 1) a title, 2) an abstract, 3) an introduction, 4) objectives, 5) a literature review, 6) statement of the research question, 7) a methods section, 8) results (yes, I know you don't have results yet -- just bear with me), 9) a conclusions or discussion section, and 10) a bibliography. You may also need an appendix or two. While some deviations from this organization may be appropriate for some subjects and some advisors, we will focus our discussion here on the elements named above.

#### *Title*

Obviously, the title must be pertinent to your project, but it should also indicate a sufficient grasp of the subject matter to suggest a focused effort. The proper usage of important keywords will go a long way toward convincing your advisor that you understand what is important about the project you are proposing.

#### *Abstract*

The abstract is a brief summary (300 to 500 words) of your proposal. It should include the research question to be answered, the proposed methodology and the expected results. If more than one hypothesis is to be tested, this should be stated in the abstract. It is not at all unusual to write the abstract last. If written first, be prepared to change it once the proposal is finished.

### *Introduction*

The purpose of the introduction is to provide the background for all that is to follow. It is generally very focused, with the goal of convincing the reader of the importance of your problem. There is no particular formula for doing this, as it varies somewhat from subject to subject. In general, though, it will include a historical basis for the problem, some discussion of the missing pieces of information that will prove pertinent to your problem, and perhaps a development of the research question itself by following specific developments in the literature (see Review of Literature below). The Literature Review section may or may not be folded into the Introduction, but you must be careful not to lose sight of the goal of this section; i.e., to focus the reader on the reason for conducting your proposed research.

### *Objectives*

Objectives are not always part of a separate section. Sometimes they are included with the Introduction, sometimes with the Review of Literature, and sometimes they can be replaced with the Statement of the Research Question. You should check with your advisor as to his or her personal preference. The purpose of the objectives is to focus both you and the reader on the reason for undertaking the research.

### *Review of Literature*

The decision to write a separate Review of Literature section depends, in general, on the amount of literature to be reviewed. If the body of literature is scant and can easily be incorporated into the Introduction section without diluting its focus, that may be the best place to put it. If, on the other hand, the literature is sufficiently massive that the focus of the Introduction section is likely to be lost if it is included there, then a separate Review of Literature section is probably appropriate.

Whichever the case, it is not imperative that you cite every study that has any bearing on your project (although you should show evidence in your Bibliography section that you are aware of most of them). It is imperative, however, that you cite the most important ones and describe their work well enough so that you can show how what you propose to do builds on what they have done. You must critically evaluate the various articles in the literature to determine which ones are fundamental to your research question and which are not.

### *Statement of the Research Question*

The Statement of the Research Question is not always a separate section, it may be part of the Review of Literature. It is, however, an essential part of every proposal. You must make it clear in this section how what you want to do differs

from what has been done before and how it builds upon the past work. You should also be able to show that the question you want to answer will further the state of knowledge in your field. Finally, the statement of the research question should culminate in the statement of one or more testable hypotheses that you think will answer the question you propose.

It is not uncommon for students to select a research question, begin the writing process, and then find out that they have not asked the best (or even the right) question. Where do you find good research questions? That in itself is a good question, not easily answered to the satisfaction of a novice. Sometimes, but only rarely, you can find questions posed at the end of technical articles. The problem with this approach is that the author(s) of the article are probably already working on those questions or they would not have posed them. These should not be ignored completely, however, because they may be helpful in determining the directions others are already taking.

If not from others, then where will the research question come from? The answer is, from you. It is your task to read and sufficiently understand the literature such that the next step (or steps) become obvious. This takes time and effort that can not be easily discounted. There are no shortcuts to this process. Creativity and imagination play an important role. Being able to think about a topic in a totally new way will certainly make the development of the question much easier. But if that seems too big a leap to start with, think in smaller terms to start with. Perhaps something as simple as writing down those questions you would want answers to given the state of knowledge in your field? Then try to determine which of those questions you think are the most important to answer.

It will certainly help to discuss your ideas with your advisor, but you should not expect him or her to develop the question for you. This is not a case of finding out what your advisor wants. It may be the case that they do not know what the next step should be. You may, at this point, know the literature, or the topic, better than they do. They can, however, give you feedback on the potential of your ideas. It is still your responsibility, though, to make the case for your proposal. I realize that these words may not be comforting to someone struggling with the process for the first time, but developing a research question is a hurdle that you must clear to proceed.

If you are stalemated and unable to see a way to proceed, consider that one source for research questions lies in areas of controversy. If some of the articles you have read suggest one outcome and some the other, examine the articles more closely to see if serious flaws in one or more of the studies (all studies have flaws to some extent, the trick is to identify those flaws that inappropriately influenced the outcomes) might have contributed to the controversy or if it could be something more fundamental. All studies require assumptions to reduce the question to manageable proportions (thus the flaws). Are the assumptions of the articles different? If so, which ones are most likely to be problematic? Can these be tested?

If controversial topics are not available, examine the literature for articles where the results were unexpected and not well understood. Read those articles carefully for clues as to why the results turned out the way they did. If nothing obvious turns up, consider designing a study that might unveil the reasons for those outcomes.

Once you understand the question, you must reduce it to one or more testable hypotheses. Some research questions may be answered with a single hypothesis, although it may require a complicated experiment to test it. Others may be better broken down into multiple hypotheses that can be tested individually, perhaps in parallel or perhaps serially. It may, for example, be necessary to establish the relative importance of some critical parameters before proceeding with the main part of the study. The choice of the hypotheses is as important as the development of the question itself. If you are not able to state testable hypotheses, you do not yet understand the question you are proposing to answer.

Ultimately, your research question must be answerable within the limits of resources available to you. You will probably need the help of your advisor (and possibly committee) in making this determination, especially if you do not have a complete grasp of the scope of the larger project, but it is an issue you must consider.

### *Preliminary Testing*

At this point it may be helpful to conduct preliminary testing to narrow the scope of the study you propose. If the literature does not suggest a range of input variables and the possible list is so large as to be unwieldy, preliminary tests can be used to suggest the most important variables and the most important range of values for those variables. For example, if it isn't known whether a response to a particular input is linear or not, perhaps measurements (or simulations) at three or four widely spaced values of that input will suggest a strategy. Of course that outcome may not be definitive since the three or four points could still fall on a straight line and the response in-between them be curvilinear.

Preliminary testing can also be used to select between several possible research questions or alternative testing methodologies (see below). Carefully designed, preliminary testing can suggest the probability that what you propose will be successful. Please remember that preliminary testing is not intended to be definitive and it must not be allowed to significantly derail you from the main focus of your study. It can, however, assist you in focusing your efforts on the important issues.

### *Methods*

Of equal importance to the establishment of the research question is the selection of the methodology to be used to test the hypotheses. It would be the rare case that only one methodology would be appropriate to a given study, so you must consider the choices available, comparing their advantages and disadvantages for your project. You should be able to show that you are making

an appropriate choice. It may even be appropriate for you to conduct, and report on, preliminary tests showing the efficacy of a few alternatives.

The question may arise as to how much detail should be included in a dissertation proposal, since unexpected outcomes quite often dictate changes in that methodology. The answer typically comes down to this: you must provide sufficient detail to demonstrate that you can successfully complete the project if everything goes as expected, and discuss how you can adapt your procedures if it does not. It is not appropriate to say that you will vary the inputs and monitor the outputs to see what happens. If you don't design the study appropriately you may not get the results you are looking for.

Be sure to consider not only the experimental procedures (if appropriate) but the analytical procedures as well. It is not uncommon for students to spend an disproportionate amount of time worrying about how to collect the data without considering how to analyze the results. While it is true that the analytical procedures may depend upon the nature of the results, you should make your best estimate based on the expected outcomes.

You must be careful to select the data analysis procedures based on the hypothesis to be tested (and the nature of the data) and not on your familiarity with, or preference for, a particular software package. It is usually preferable to change software packages to overcome a limitation with a particular package than to change the analysis procedures.

### *Results*

Clearly you don't have any results to present since you have not completed the study, but do indicate what results you expect. If you don't know, you probably haven't thought sufficiently about the problem. You should have some expectations even if they eventually prove to be wrong. It will be the rare case that you will not see unexpected outcomes. After all that is why you are doing the research. If you knew the outcomes with certainty you could head to the beach and phone in the results. Even so, the research question is fundamentally a hypothesis, which will either be supported or refuted (if not confused) by the results. Discuss the options for each case (including confusion); i.e. the impact of the hypothesis being true, false or inconclusive?

### *Conclusions*

Your conclusions should re-state your research question, summarize your methodology you propose for answering it and briefly discuss the impact of the expected results. You should also summarize the impact of outcomes that do not conform to expectations and briefly indicate how they might affect the direction of your research. Present an estimate of the expected costs of your project and the estimated timeline. Your first estimates will likely be quite far from reality, but the feedback from your advisor and committee should allow you to fine-tune them to the point where they are more realistic.

## **The Process**

As important as the document itself is the process you will go through to produce it. Writing the proposal will force you to think about your project in more detail than you might otherwise. A research plan that is not very well thought out has little chance for success.

Revisions are a valuable part of the process. You should expect the proposal to be revised several times as you consult with your advisor and your committee. It would be the rare PhD research proposal that required no revision after the first draft. In fact, it would be the rare research proposal of any kind that would require no revision after the first draft.

## **The Defense**

The extent to which you will be called upon to defend your proposal depends, in large measure, upon your advisor and your committee. Some advisors make it a part of the preliminary examination, others consider the proposal a separate exercise. If you are asked to defend your proposal orally you will generally be given the opportunity to briefly summarize the proposal before the committee, then field questions from the committee as they try to determine how well you understand the proposal you have written. You should have thought enough about the topic that you can freely discuss the problem areas, possibly proposing alternative methodologies to handle hypothetical outcomes proposed by the committee. It is not important that you memorize the entire body of literature, but you should be familiar enough with the important studies that you can discuss how they pertain to your proposal. A final revision of your proposal may be one of the outcomes of the defense.

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