



The Professor Francis Allotey Graduate School

Office of Graduate Studies (OGS)

**THE PHD RESEARCH WORK –
The Skills That Need To Be Developed**

Introduction

To achieve the PhD degree it is necessary to demonstrate that you have mastered the skills necessary to carry out research to professional standards. The point of the PhD is not to demonstrate your brilliance (although this might also occur), but to demonstrate that you have mastered a set of research skills.

Professional research standards means:

- You have something to say: i.e. you are able to present a coherent argument and can tell a story that your world-wide peer group is interested to hear (the thesis).
- You are able to evaluate the worth of what others are doing. Literature surveys should demonstrate that you have the maturity, critical and analytical skills to compare your work to previous and contemporary research and to point out the limitations.
- You have the astuteness to discover where to make a contribution and the ability to evaluate and re-evaluate your contribution.
- You can communicate effectively to the world wide peer group by writing clear, precise, logical conference and journal articles and making presentations at international conferences, workshops and seminars. You can demonstrate the importance/interest of your research to expert and non-expert visitors.
- You have mastered the appropriate experimental, mathematical and computational research skills. You are able to conduct literature searches, review conference and journal submissions.
- You are able to formulate plans to meet short-term and long-term goals. You are able to meet deadlines. Professional means that you have the determination and application to work to the conclusion of what you set out to do. Plans and goals will of course change but make sure you address the underlying reasons.

The PhD Thesis

The PhD Thesis aims to allow the examiners to judge whether the candidate has met the above requirements. It should not be a record of all of the student's work in the department.

The Thesis should be structured to include:

Identification of unsolved problem and reason for solving it: The nature and purpose/motivation for the investigation should be clearly stated. The thesis approach/standpoint and whether the purpose was substantially achieved should also be made clear.

Status of research in direction of solution: The relevant background material and limitations of existing methods. The candidate must show that he/she has an adequate knowledge of the subject

and of the literature and can critically place his/her work in a wider context. The literature survey should not be encyclopaedic.

Find a solution. Development of own ideas and theoretical framework backed with mathematical analysis.

Demonstration that it is a solution: This should involve the implementation, justification for assumptions and evaluation of evidence. You must also

- Demonstrate analytical skills.
- Assess the suitability of the solution
- Evaluate the importance of the contribution
- Identify directions for future work

Appendices: Complete bibliography with numbered list of references. References in text should use names and numbers.

You must remember that: Original research contributions come about after diligent review, concentration and analysis. The world is your oyster and in research everything is up for grabs.

“Caminante no hay camino. Se hace camino al andar” (Traveller, there are no paths. Paths are made by walking)

Choosing a Topic

Choosing a topic is often the most difficult part of the Thesis writing process. Try to:

- Develop a topic that has interested you throughout your graduate or undergraduate career
- Think about the top three issues you want to study, then turn them into questions
- Review papers you have written for classes, looking for a pattern of interest
- Look at class notes; professors may have pointed out potential research topics or commented on unanswered questions in the field
- Talk with professors or advisors about possible topics
- Replicate somebody else's study
- Conduct research on a broad topic to discover gaps in the literature

Keep the following cautions in mind:

- Get feedback on a potential topic from your advisor; your topic may not interest others in the field as much as it interests you
- Do research to discover why your topic has not been studied before

Writing the PhD Research Proposal

The research proposal serves as a recipe for the Thesis. Therefore, you should be as detailed and specific as possible. Remember to:

- Identify gaps in the literature
- State your thesis clearly
- Outline the questions you plan to address in the Thesis
- Establish a strong research design or theoretical framework for your study
- Describe the topics you plan to cover in each chapter of the Thesis
- Speculate upon potential results of your study
- Discuss the importance of your study to the field

Conducting the Research

Writers often have difficulty maintaining their own voice when they work with sources. The strategies listed below will help you to use your sources effectively:

- Keep a researcher's notebook in addition to taking notes on specific sources. The notebook keeps you in continual dialogue with your sources and your topic.
- Take summary notes as well as specific information notes
- Discuss your ideas with others as you conduct research
- Think about how each source specifically applies to your topic. The authors of your sources are advancing their argument, not yours. Therefore, you need to carefully consider which source material you will use.

Writing the Thesis

Finding model theses or dissertations can help you gauge how much (or how little) you have to do. A good model can also serve as an inspiration for your project. Look at theses that your university or department has accepted.

Maintaining your focus is the key to completing your Thesis. Try the following strategies:

- Tape a copy of the PhD research proposal to your computer, asking yourself if you have expanded on all of the ideas advanced in the proposal
- Work "within" your research proposal, adding key words and concepts and then expanding upon them
- Write your first chapter early in order to make sure that subsequent chapters fulfill promises made in the introduction. This strategy helps some writers to focus their writing; for others, however, writing the first chapter proves difficult. See what works for you.
- Know your thesis and let it dictate what you include; refrain from writing everything you know
- Organizing both your workspace and your ideas will help the research and writing process proceed smoothly. You may want to:
 - Purchase a file cabinet just for the Thesis; each drawer may contain drafts and research notes for each chapter. Write explanations of the contents of each file folder and file drawer
 - Date drafts to remember the order in which you worked on chapters
 - Set deadlines for submitting drafts of each chapter. Meet your deadlines even if you cannot deliver everything you promised
 - List what each chapter or section should cover, including both general ideas and specific examples
 - Look at style guides; they may provide an organizational formula for your field
 - Use outlining software or the outline tool on your word processor

Obtaining feedback from advisors and colleagues will help you to refine your ideas as you write. Try the following strategies:

- Present sections of your Thesis as conference papers or submit them for publication. Audience members and editorial boards frequently provide valuable comments
- Meet regularly with committee members to get feedback on your work-in-progress
- Get advice on your work throughout the writing process (while developing and organizing ideas, during the drafting phase, as you revise)
- Form a Thesis group that focuses on presenting and critiquing work-in-progress
- Bring your Thesis to a writing center consultant for feedback
- Revising is essential to the thesis/Thesis writing process. Often, you will discover new ideas as you write, or your ideas will change as you research your topic and receive feedback on your work.

Managing Your Time

Finding time to write is often students with jobs, families, and other commitments. The following techniques should help you manage your time effectively:

- Make the completion of your Thesis your top priority. Do not waste time on points or questions outside the scope of your research
- Spend time on your Thesis at least five days a week. Even if you only have one hour on some days, consistent work will help you to keep ideas and source material fresh in your mind
- Know your personality and choose a working style that goes with it. For example, if you are a social person, you may want to work in a computer lab instead of at home
- Know your distractions and schedule your work time when distractions are at a low level
- Give yourself time to think; you often will need more time to think than you do to write
- Set aside time for yourself, your partner and your children (negotiate the time together so that you will be available at the same time). It is important to communicate with those around you
- Try out different schedules, for example, shifting from morning to evening hours. Sometimes taking a break from particular work habits is helpful

The Structure of the Thesis

The overall structure of a PhD thesis (which means argument/ storyline/position) should be something like this:

- Identify/explain gap in knowledge (Ch. 1)
- Formulate questions or objectives to fill this gap (Ch. 1)
- Define terms, develop criteria for judgement, develop conceptual frameworks for investigation/analysis or identify impacts/elements that need to be measured (literature review chapters)
- Devise and justify (most appropriate) methods to answer questions or achieve objectives (methodology chapter)
- Outline findings i.e. answers to questions (usually one chapter per question/objective)
- Explain implications of this contribution to knowledge - how does it change the bigger picture? What are the limitations of the research and what still needs to be done (conclusions chapter)

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