

Guidelines for Manuscript-Based Thesis

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1. Deciding to Complete a Manuscript-based Thesis^{i,ii,iii}

It is common practice in many disciplines that students publish the results of their research as manuscripts in journals or conference proceedings during the course of their thesis studies. This is an important consideration both to the student's career development as well as an appropriate and timely way to disseminate information.

1.1 What is a manuscript-based thesis?

As an alternative to the traditional thesis format, the thesis can consist of a collection of papers of which the student is an author or co-author. These papers must have a cohesive, unitary character making them a report of a single program of research.

In order to complete a manuscript-based thesis in the Department of Community Health Sciences, the following apply:

- manuscripts must be current and completed for the thesis project
- the student must be first author of the manuscripts
- for a thesis to be considered "manuscript-based," the following apply:

- MSc – a minimum of 1 manuscript deemed ready for journal submission according to the supervisor and supervisory committee
- PhD – a minimum of 3 manuscripts deemed ready for journal submission according to the supervisor and supervisory committee

1.2 Considerations

In making the decision, it is important to take into account:

- the student's desired career (academic, business, education...),
- support from the supervisor/supervisory committee,
- supervisory committee members' publication experience, and
- the required time commitment.

It is also important to consider whether it is possible to design a thesis project that can be easily combined and integrated in a coherent manner, for example:

- conducting sub-studies,
- using a staged approach by:
 - conducting a scoping review as the basis of the study;
 - developing case studies to enhance the results; or
 - analyzing secondary data to provide context.

1.3 Benefits of Completing a Manuscript-Based Thesis

A number of benefits can result for both the student and supervisor, including:

- Better positioning for future career (postdoctoral fellowships or jobs),
- Gaining publishing experience – something every academic needs,
- Potentially increasing research efficiency,
- Potentially leading to more practical and useable results,
- Allowing greater depth, breadth and comprehensiveness,
- Opportunities for real life learning (manuscript preparation, submission process, peer review, etc.), and
- Undergoing a more rigorous process in preparing results for publication than for a traditional thesis (monograph), with the resulting thesis potentially being high quality.

1.4 Challenges of Completing a Manuscript-Based Thesis

Students may experience a variety of challenges in using this approach including:

- Strong emphasis and need for originality
- Working within uncertain timelines
- Developing a thesis that is coherent
- Structuring and formatting, as there may be very different audiences and purposes for the various papers
- A longer time commitment may be required because:
 - Writing manuscripts can be difficult the first time around
- Circumstances may change while completing the research preparing the thesis, e.g.
 - Unfavorable results of a review;
 - Unexpected (or no) study results.

2. Process for Developing a Manuscript-based Thesis

2.1 Planning Process

Students who have completed a manuscript-based thesis along with their supervisors make the following suggestions:

1. Plan a manuscript-based thesis from the beginning of proposal development, ensuring full committee support
2. Organize the thesis and completion process to facilitate manuscript development
3. Outline the planned manuscripts and identify targeted journal(s) in the thesis proposal
4. Develop a timeline to complete each manuscript and submission

2.2 Student as Primary Author

In general, when co-authored papers are included in a thesis, the candidate must be the primary author (the author who has made the most substantial contribution) for all papers included in the thesis. In addition, the candidate is required to make an explicit statement in the thesis as to who contributed to such work and to what extent. This statement should appear in a single section entitled "Contributions of Authors" as a preface to the thesis. The supervisor must attest to the accuracy of this statement at the doctoral oral defence. Since the task of the examiners is made more difficult in these cases, it is in the candidate's interest to clearly specify the responsibilities of all the authors of the co-authored papers.

2.3 Role of Committee Members as Authors

It is advisable to discuss authorship issues at a thesis supervisory committee meeting as early as possible in discussion of thesis research.

As the research evolves, or as circumstances change over time, it is important to review and confirm the format of the thesis periodically with your supervisor and thesis supervisory committee.

In no case can a co-author of any component of such a thesis serve as an External Examiner for that thesis.

2.4 Manuscript Editing

The principles set out by FGS for editing the thesis apply to published manuscripts. Ultimately, the thesis must be the student's own work. Editing should take place as part of a learning process, in a collaborative effort between the student and his/her supervisor and other academics in the University. Working with a student to teach him/her how to edit the thesis is part of a learning experience; having a thesis professionally edited is not acceptable.

3. Formatting Your Manuscript-Based Thesis

3.1 General Format

Manuscripts can be stand-alone chapters in a thesis, or parts of a chapter. However, the thesis must be more than a collection of manuscripts. All components must be integrated into a cohesive unit with a logical progression from one chapter to the next. In order to ensure the thesis has continuity, connecting texts that provide logical bridges preceding and following each manuscript are mandatory.

Text of the manuscripts that are included as part of the thesis must conform to the "Guidelines for Thesis Preparation" with respect to font size, line spacing and margin sizes. (Reprints of published papers may be included in the appendices at the end of the thesis.)

It may be helpful to include the name of the journal to which each manuscript has been submitted and to format each manuscript according to the Instructions for Authors for that journal. Original research manuscripts would generally have the following sections: Title page (including authors, authors' affiliations, etc.), Abstract, Introduction, Methods, Results, Discussion, Acknowledgements, References, Tables, Figures. Other types of manuscripts may have different formats (eg. review articles, methods manuscripts).

3.2 Thesis Table of Contents

1) Contributions of Authors

Include an explicit statement clearly identifying the responsibilities of all authors of the co-authored papers.

2) Introduction

Clearly states the rationale and objectives of the research. A clear case for why the manuscripts form a coherent body of research should be made.

3) Literature Review

A comprehensive review of the literature (in addition to that covered in the introduction of each paper)

4) Methods

It may be helpful to include a detailed Methods chapter where all methods used in conducting the thesis research are described in detail. This level of detail would not normally be seen in a published manuscript.

5) Conclusion

The final conclusion should reflect the entire body of research presented in all parts of the thesis, including all manuscripts. For PhD theses, the original contribution to the advancement of knowledge in the research area should be clearly stated in the final conclusion.

6) Bibliography

It is clear that the list of references may be formatted differently in each manuscript. For this reason, a general alphabetically-ordered Bibliography chapter, including all references cited in the entire thesis (ie. those cited both in manuscripts and in chapters which do not include manuscripts), is important.

7) Additional Information as Required

Manuscripts for publication are frequently very concise documents, therefore where appropriate, additional material must be provided (e.g., in appendices) in sufficient detail to allow a clear and precise judgment to be made of the importance and originality of the research reported in the thesis. *Additional material can also be placed in other sections of the same chapter, as appropriate.*

3.3 Ethics Approval to Conduct Your Study

An Ethics Certificate is required for all research involving human subjects – it must be on the student’s file in order to graduate.

Research involving human subjects includes ‘...the secondary use of data previously collected from human subjects...’

If the supervisor has a current ethics certificate for a project that includes the student’s work, the supervisor must send a letter to the Office of Bioethics to request the student’s name be added to the certificate (a new application is not required).

If you are uncertain about the need for an ethics certificate, please discuss this with the Office of Bioethics. A brief note indicating ethics approval is not required should be on your file if this is the case.

3.4 Permission from Publisher to Include Previously Published Work

Where material previously published (or in press) by the candidate is included as part of the thesis, it is the candidate’s responsibility to:

- 1) Ensure that permissions from copyright holders are obtained,
- 2) Clarify his/her own contributions in multi-authored publications, and
- 3) Provide in a preface to the thesis, full citation(s) to those publications.

The candidate must also include signed waivers from any co-authors of unpublished manuscripts.

These documents are NOT included in the thesis; they should be submitted with the thesis to Faculty of Graduate Studies (as separate documents).

ⁱ Draws on guidelines developed at Canadian universities, including *McGill University* <http://www.mcgill.ca/gps/students/thesis/programs/guidelines/preparation/> and *University of British Columbia* <http://www.grad.ubc.ca/current-students/dissertation-thesis-preparation/types-theses>

ⁱⁱ Publication-based Thesis – An Option? – Presentation by Dr. Marja Verhoef to CHS Students & Faculty March 26/2010

ⁱⁱⁱ University of Calgary FGS Thesis Guidelines at <http://grad.ucalgary.ca/current/thesis/guidelines>