The structure and table of contents of a master's thesis

Markku Norvasuo v. 3, 04 Feb 2015

The overall structure of the thesis should not be confused with the table of contents, but these two are related. In a research plan, an outline of the work is useful. It can be given without a detailed table of contents (which is, apparently, prone to changes in any case) on a more abstract level.

Before going further, it is useful to glance how the thesis is evaluated (in the School of Engineering).[1] There are five subject areas and under them altogether 14 evaluation points, each given a grade from 1 to 5:

	(Explanation)
Definition of research scope and goals • Definition of research scope • Presentation of goals in the thesis	Research scope has been defined. Clearly defined goals. The research questions and hypotheses contained in the scope of research and goals are evident from the thesis.
Command of the topic • Command of the literature • Command of the topic	The student demonstrates command of the topic and understanding of the scope of research. The student demonstrates understanding of the relevant theoretical framework. The student demonstrates skills in making use of literature and other sources of information.
Methods, conclusions • Command of the research method • New significant results • Correctness of the results and scrutiny of errors • Conclusions, quantity, quality and relevance	The student demonstrates ability to choose justified methods for reaching the goals. The student demonstrates ability to apply the chosen methods. The thesis contains references to scientific publications. The thesis presents well-founded conclusions drawn from the results. The results answer the research questions presented.
Contribution to knowledge and thesis structure • Achieving goals • Organisation, coherence and clarity of the thesis • Share of independent input • Keeping to the schedule	The thesis is relevant to the set goal. The thesis is a well-organised logical whole. The thesis makes an original contribution to the existing body of knowledge, i.e. it is produced by the student.
Presentation and language • Language • Presentation and graphic design	The overall appearance of the thesis is appropriate. The thesis contains no such structural, grammatical or spelling errors that complicate reading. The thesis is written in coherent, formal style. The thesis is a well-organised, coherent whole. The given guidelines have been followed.

[1] Master's thesis guide of the Aalto University School of Engineering, 2014, 25–26.

The structure of the thesis should help to present your merits: knowing the literature, understanding the theory, mastering the methods, and presenting the findings. This is why the structure of the thesis depends on the problem in case.

It is possible to give a relatively generic overall structure for a thesis. It is applicable over many disciplines, because it can be interpreted in different ways. The structure is:

A. Introduction
B. Theoretical part
C. Own contribution (the handling of the subject)
D. Conclusions

Each of these parts (especially B and C) may contain several chapters depending on the subject matter. Therefore, the above structure should not be used as such but as a starting point for first finding a good main chapter division and then drafting the table of contents.

This generic structure is just the beginning. The headings "Introduction" and "Conclusions" are typically used as such in the thesis, but parts B and C should be applied according to your particular needs. They could form the 3–5 central chapters of the thesis, sometimes more, but renamed according to your needs. Here is an example of a relatively simple "real" chapter division (suggested in a blog of the University of Helsinki).[2]

Introduction (e.g. 5 pages)
Theory (10–15 pages)
Methods and materials (10–15 pages)
Analysis (15–20 pages)
Discussion (5–10 pages)
Conclusions (3–5 pages)

Annexed to this paper there are some more practical examples, which demonstrate how different these central chapters can be. Please notice also the approximate lengths of the chapters. When planning the main chapter division, one approach is to think of the *research questions:* the main question and the subquestions. What is the relation between them and the headings of the main chapters?

When it comes to the order of the practical writing process, typically the introduction (A) is relatively difficult. It might be a good idea to write it last. On the other hand, your own contribution (C) can be quite easy to write, because you know well what has been done and how to describe it.

In addition to the chapters, the final thesis has other parts, such as the *abstract,* the *table of contents*, in some cases a list of *endnotes,* the list of *sources,* and the needed *appendices.* What is required in this respect depends on the detailed thesis instructions of each school or department.

Here are some further considerations:

Background

One way to understand the difference between the introduction and the background sections has been given in an example by John Forester: "An introduction says, 'Hi, this evening we'll explore strategies of writing in planning,' but backgrounds often turn run in reverse ('Well, before we can explore writing in planning, what is planning anyway?...')."[3] Therefore, **background** may well belong to the introduction (A) or, alternatively, belong to the theoretical part (B), depending on the case.

On the other hand, introduction in a master's thesis is an important part. In spite of its compactness, it may contain several important aspects, for example: a shot introduction, the "state of art" of the research,

[2] http://blogs.helsinki.fi/valmistu-nyt/nain-se-tehdaan/gradun-rakenne/ [In Finnish.]
[3] John Forester in lecture notes for a writing workshop at Aalto University, 7 June 2011.

previous studies, research questions, the scope and limits of the study, and the presentation of research material.

Usually, when the background section belongs to part B, it is assumed that it is common to all chapters of part C. *Sometimes,* especially if the theory contribution is very contextual, it may be reasonable to have several background sections at the beginning of each chapter of part C, in this manner:[4]

Chapter C.1
    background
    handling
Chapter C.2
    background
    handling
…

Research methods

These can also belong to the introduction part (A) or the theoretical part (B). The words "theory" and "methodology" can sometimes overlap. "Method" can be something limited that is applied as part of the study, as when empirical material is analysed by statistical methods. "Method" could as well be the central topic of the thesis. This may be the case for example in engineering: How to find a solution to a given problem or apply a method to some generic problem.

Literature review or study

This can belong to the theory part (B) or, again depending on the subject, essentially constitute that part. One type of master's theses is a technology evaluation type of thesis about the "state of the art" in a particular field.[5] In those cases, the literature review is part of the presentation of the theory and its advances.

Presentation of the research material

The research material can be presented in a separate chapter between the introduction (A) and the theory part (B). However, often it is described in the introduction part.

Analysis vs. Discussion

The term "analysis" refers to empirical work, i.e. some research material to be analysed. Analysis could be the last chapter of the handling section (C). In engineering sciences a thesis often aims at the solving of some technological problem and therefore has a "constructive structure".[6] The theory part may suggest possible solutions; results are then obtained from measurements, calculations etc., and analysis follows thereafter.

Discussion is more general: its purpose is to reflect on the results and to compare them with previous studies and the theory. It may also assess the value of the work, problems, limitations, generalization, potential applications, and the need for further studies.[7]

Some examples

These are randomly selected examples of master's theses of Aalto University, available in English. Only two levels of the table of contents have been shown, lower levels have been discarded. (The number of pages has been calculated by subtracting, so the real number may be less.)

---

4 This is typical for historical analyses; see http://www.utu.fi/fi/yksikot/hum/yksikot/yleinenhistoria/opinnot/kurssit/Sivut/graduntekijan-abc.aspx [accessed 5 October 2014; in Finnish].

5 What is a Master's Thesis? Aalto University, School of Electrical Engineering. Available: https://into.aalto.fi/display/enmasterelec/Master%27s+thesis [accessed 5 October 2014]

6 What is a Master's Thesis?

7 Hirsjärvi, S. et al. (2004). *Tutki ja kirjoita*. Helsinki: Tammi, p. 246. [In Finnish.]

Example 1: Virtanen, Kirsi: *The use of sustainability indicators in industrial applications* (2013). [Chemical engineering]

1 Introduction (1 page)
2 Sustainability indices (41 pages)
2.1 General
2.2 Industry stakeholders
2.3 Indicators and indices
2.4 Composite indicators
2.5 Environmental sustainability index
2.6 Economic sustainability index
2.7 Social sustainability index
2.8 Legal aspects
2.9 Sustainability index summary
3 Methods and used material (11 pages)
3.1 Metric project sustainability indices
4 Research methodology and results (16 pages)*
4.1 Case 1: Particle emission collector
4.2 Case 2: Waste water cleaning unit
5 Conclusions (2 pages)
6 Suggestions for further study (2 pages)
* The "methodology" is here a short mention of a specific sustainability index tool set that was used.

Example 2: Susanne Lagerström: *Let's go out and play: Designing interactive outdoor games for children* (2013). [Electrical engineering]

1 Introduction (4 pages)
1.1 Background
1.2 The Scope of this Research
1.3 Research Goals and Questions
1.4 Structure
2 Theoretical Background (21 pages)
2.1 Interaction Design
2.2 Interaction Design and Children
2.3 Methods for Interaction Design and Children
2.4 Children and Play
2.5 The Importance of Outdoor Play
2.6 Head Up Games
2.7 Designing Digital Games
2.8 RaPIDO
2.9 Related work
3 First Evaluation (18 pages)
3.1 Study Setup
3.3 Second Iteration
3.4 Third Iteration
3.5 Discussion
4 Second Evaluation (17 pages)
4.1 Study Setup
4.2 Designing the Games
4.3 First Iteration
4.4 Second Iteration
4.5 Third Iteration
4.6 Discussion
5 Conclusion (2 pages)

Example 3: Carl-Mikael Sågbom: *Strategic alliances as creators of interorganizational value* (2014). [Civil and Structural Engineering]

Introduction (4 pages)
1.1 Motivation for the research
1.2 Scope and research questions
2 Literature review (27 pages)
2.1 Strategic alliances and partnerships
2.2 The value concept
2.3 Creating value in strategic alliances
3 Methodology (5 pages)
3.1 Data collection
3.2 Description of empirical context: Rapal Oy's partnerships
3.3 Dissemination of research findings
4 Results (13 pages)
4.1 Interview results by theme
4.2 Evaluating the partnership
5 Discussion (7 pages)
5.1 Theoretical implications
5.2 Practical implications
5.3 Limitations
5.4 Future research suggestions
6 Conclusion (2 pages)

See also:

Master's thesis guide of the Aalto University School of Engineering. (2014, February 24). Aalto University, School of Engineering. Available at: https://into.aalto.fi/pages/viewpage.action?pageId=13419287