



Writing a Cartography Master Thesis at TU Dresden

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General Expectations Concerning a MSc. Thesis

Work on a master thesis addresses some principal academic abilities:

- to deal with an at least in major parts unsolved scientific task
- to acquire new knowledge related to a scientific task
- to investigate, evaluate, and propose relevant scientific methods and processes including multidisciplinary approaches
- to discuss and justify decisions in a scientifically correct way
- to structure contents in a logical and well-arranged way fostering comprehension
- to assemble and phrase the thesis in a precise and concise way
- to thoroughly reference all consulted documents and external information
- to present results to a scientific audience and to discuss results with experts.

1. The Thesis Assessment Board

The Thesis Assessment Board (abbreviated TAB) is responsible for monitoring the work progress and, finally, in charge to review and grade the thesis.

Reviewers are nominated from Technische Universität Dresden (TUD), first supervisor, and from one of the partner universities. A third external reviewer can eventually be nominated for providing specific expertise in agreement with the TAB.

The TAB consists of:

- the TAB chair at TUD, Prof. Dirk Burghardt,
- the first supervisor,
- the external reviewer (a member of the partner universities),
- the general observer, Dr. Corné van Elzakker (University of Twente).

2. The Supervisor(s)

A supervisor will be a coach/adviser but every student is personally in charge of the whole process.

The student shall actively manage consultancy and steer the agenda of meetings. He/she should prepare for meetings, send relevant material in advance, and react on comments given.

The supervisor will give feedback on crucial methodological decisions of the research. He/she will discuss (intermediate) results. The suggestions and critics of the supervisor have seriously to be considered.

Short minutes of a meeting with supervisor(s), to be actively distributed by the student, will assist the memory, avoid misunderstandings and form a reference of subsequent discussions.

Smart time management is essential for success. Regularly checks make sense. Is the actual status still in accordance with the schedule? Observed delays and predictable time shortage should be reported to the supervisors as early as possible.

3. The Reviewer

The reviewer will be involved in:

- The assessment and discussion of the Extended Research Proposal,
- the evaluation of the Mid-term Presentation, and
- the assessment of the final thesis.

An active involvement into an ongoing consultancy depends on mutual agreements. A student can, however, also directly contact the reviewer and ask for specific recommendations, opinions, annotations etc.

4. The Master Thesis

A master thesis is a defined scientific work. It is different from a technical or project report. A comprehensive scientific treatment of a specific problem and outcome are core elements. Scientific significance of the efforts shall be a prime goal. Duration is fixed to 6 month at maximum. The Master Thesis covers 30 ECTS.

Steps of writing the thesis:

- Topic selection
- Familiarisation with the topic, meaning intensive reflections on published and own ideas to be compiled into an Extended Research Proposal (comp. following section)
- Continuing literature research and discussion of the state of the art
- Giving the thesis a logical structure. Structure is subject to continuous refinement

- Dynamic development of content and insertion to the structure
- Presentation of the progress at mid-term (after 3 months, comp. following section)
- Phrasing and layouting of the thesis
- Eventual cross-reading by a native English speaker or – at least – by volunteers with a good command of English
- Submission (comp. following section)
- Final presentation.

5. Important Stages

5.1. *Extended Research Proposal*

The extended research proposal:

- should be an elaborate initial concept summarising the student's knowledge and ideas concerning the topic
- should imbed a draft schedule how to work down the task in limited time
- is not carved in stone, and may be subject to change during further work
- shall stimulate a target-oriented work style
- should contain research objectives and clear research questions
- is a basis for advices by the Thesis Assessment Board
- has to be approved by the Thesis Assessment Board.

Road to an Extended Research Proposal (ERP):

- Students are in charge.
- Engagement should start right after topic decision has been approved.
- A reference management system should be used right from the start.
- A log book can fix ideas and questions.
- The ERP template (distributed by Corné van Elzakker) provides the structure.
- The ERP should be discussed with the supervisor (and, eventually, with the reviewer) before presentation to allow for adjustments.
- A finalised ERP has to be distributed to the TAB Chair (at TUD Prof. Dirk Burghardt), the supervisor(s), the reviewer and Dr. Corné van Elzakker.
- Submission deadline and a timetable of the presentation time of the ERP will be distributed well ahead to all students.

- A session consists of 10 minutes of presentation and not more than 20 minutes of discussion.

5.2. *Mid-Term Presentation*

The mid-term presentation shall offer the TAB the opportunity to realistically assess the status of the thesis. It will, furthermore, inform the board:

- which essential parts are pending
- what changes to the ERP concept have become necessary
- whether serious problems have occurred, and what solutions can be offered.
- The purpose of the Mid-Term Presentation is not to institute another kind of examination, but to allow the TAB to advice and support the student in his further efforts to write a successful thesis at a time where support still makes sense.
- The mid-term presentation follows the same structure as the ERP.

5.3. *Submission and Presentation*

The following deliverables are due at the submission of the thesis:

- 2 printed copies of the thesis along with a CD or DVD supplement to the written document containing:
 - a pdf-version of the analogue document,
 - relevant digital data stored in a understandable structure, and
 - if applicable, source codes and programme listings, digital appendices, etc.
- a poster (template in the download section of the institute's homepage under https://tu-dresden.de/bu/umwelt/geo/ifk/studium/downloads?set_language=en and printable at the institute).
- The digital version of the thesis has to be send to all members of the TAB on submission day.

Please do not forget to actively return all borrowed items as literature, keys, etc. to the owners without a need for specific requests.

6. General Remarks on Writing

Please keep in mind the following aspects:

- Good works starts with a sensible structure. Discuss the structure with the supervisor(s) as early as possible.
- Apply correct referencing and citations. Plagiarism will definitely be checked!
- Use a reference management software (Zotero, Endnote, Citavi, Mendeley etc.).
- Do not underestimate the time you will need to actually write the thesis even if all the practical results are achieved.
- Do not use the first person view for writing.
- Abbreviations need to be explained. A list of abbreviations may be included.
- No colloquial/slang language is adequate in a thesis. Avoid exaggerations.
- All statements have to be scientifically sound. In a discussions some will eventually be questioned.
- Use our word template which provides a comprehensive formal structure for your document. You will save a lot of time. If you prefer a different word processor, copy the layout of our template as close as possible.
- Apply a consistent English spelling (British English will be preferred if you are not American).
- This guideline and the word template are provided under https://tu-dresden.de/bu/umwelt/geo/ifk/studium/downloads?set_language=en.

7. A Structural Guideline for a Thesis

As any scientific publication a Master Thesis should show a clear and logical structure. The relevance of the individual chapters will be mirrored by the number of pages attributed to this chapter. The number of pages produced is of little interest, the scientific substance is of fundamental interest.

Depending on the particular topic, the optimum structure of the thesis might look quite different. The guideline below – apart from the formal pages in front of the introduction – are a non-binding, exemplary structure of a master thesis in the field of Cartography:

7.1. *Title Page*

contents and layout shown in template

7.2. *(Task Description)*

should – if provided – be a 1:1 copy of the task description of the supervisor (simply copy and paste, or scan it and paste the image).

7.3. *Statement of Authorship*

shown in the template, has just to be signed by the author

7.4. *Abstract*

(not longer than 2 pages)

7.5. *List of Contents*

7.6. *(Appendix Content if appendix exists)*

7.7. *List of Figures*

7.8. *List of Tables*

(please delete if no tables are given)

7.9. *List of Formulas*

(please delete if no formulas are given)

7.10. *List of Abbreviations*

(please delete if no abbreviations are given)

7.11. *Introduction Chapter(s)*

At this point page numbering starts with page 1. The introduction guides the reader into the topic. One or a few examples can eventually be provided as a teaser. Typically, initiatory chapters reflect the relevance of the topic, the origins of the topic, the motivation to deal with it. An introduction may offer a clarification what will be covered in the scope of the thesis and what not. The previous aspects will logically lead to a formulation of the planned focus of the work, and should be bundled into some explicitly phrased research objectives. In order to give the reader means of

examination of the results of the scientific effort, concise and testable research questions should conclude the introduction.

7.12. Theory Chapter(s)

Typically, the theory part compiles relevant published work. It will allow to get an idea about the state-of-the-art in the chosen field of research. Quality is created by not just collecting literature, but by its linkage to the task or to subtasks of the thesis. Published statements and findings should be discussed critically, and not just be adopted without further reflection.

7.13. Methodological Concept Chapter(s)

The thesis will now continue with a proposed concept shaped to solve the individual scientific challenge. A sound concept has learned much from literature review, will bear a certain degree of innovation and, consequently, be essential in terms of scientific quality. In many cases, the core of the concept will be a smart assembly of well-selected methods into a target-oriented workflow. In other cases, there will not be the one single concept, but the job will be to compare alternative concepts in a use context.

7.14. Implementation Chapter(s)

This concept(s) will in the following be used to steer the subsequent implementation, often content of the next chapter. Practical implementation of a task in our domain will mostly include software products, and/or, a creation of customised software modules/extensions. The author should obviously reference all software, including any adoption of implemented solutions taken from the vast web-resources. In this context, a comprehension of the functionality employed is more important than a skilful use. Moreover, deficits of the tools deployed in the implementation should be named.

7.15. Results and Discussion Chapter(s)

Implementation generates results. The result chapter structures, comments, and evaluates results in a comprehensive way. Evaluation will – if applicable – look at similar reference studies and verify a scientific progress achieved in the thesis.

In the domain of Cartography results will comprise visualisations, especially maps. Since maps may require larger formats than the A4 of the thesis, the author may work with a low-resolution overview figure in combination to indicative subsets of the (map-)graphics to be reproduced exactly to scale. Whenever the thesis deals with extensive map series, exemplary samples shall be shown in the result chapter, whilst others can be placed in an appendix.

7.16. Conclusions and Outlook

The proposed structure will show a conclusion chapter at the end. The conclusion will focus on the intellectual and practical achievements of the author of the master thesis. It will concentrate on the quintessence of the findings reported within the thesis. It will emphasise the generic findings, and not stay with solutions only useful in the thesis' context. It will browse through the list of research questions as introduced above. It will honestly give a statement which parts of the questions could be answered, and which remain unanswered or vaguely covered.

As a conclusion, an outlook may be given. This outlook specifies clearly whereto – to the opinion of the author – future research work should be directed in order to complement the efforts presented.

7.17. Literature References

The author has to make sure that 100% of the sources used in the thesis will find entrance to the references. If one has made use of a reference management software, a comprehensive listing of all bibliographic parameters will greatly be facilitated. The style of all reference entries has to be consistent from citation 1 to the last one. Examples in a consistent style are given below. A very comprehensive document on correct citation has been published by Technische Universität München (TUM) and can be accessed through following the URL https://tu-dresden.de/bu/umwelt/geo/ifk/studium/downloads?set_language=en.

The reference chapter may show a substructure which lists book and journal references within one section, and internet sources in a second one. Referencing should generally display authors in alphabetic order. Contiguous page numbering ends where literature references terminate. Appendices get a separate numbering as 'A-1', 'A-2' ...

- Example for a referenced book contribution:

Bartie, P.J., Mills, S. and Kingham, S. (2008). An egocentric urban viewshed: a method for landmark visibility mapping for pedestrian location based services. In: *Geospatial Vision: New Dimensions in Cartography*, ed. by Moore, A. and Drecki, I, pp. 61–85, Springer, Berlin.

- Example for a referenced journal publication:

Gregory, I.N. and Cooper, D. (2009). Thomas Gray, Samuel Taylor Coleridge and geographical information systems: a literary GIS of two Lake District tours, *International Journal of Humanities and Arts Computing*, 3, pp. 61–84.

- Example for a referenced proceeding paper:

Møller-Jensen, L. and Hansen, E.J. (2007). Towards a Mobile Tourist Information System: Identifying Zones of Information Relevance. In: *10th AGILE International Conference on Geographic Information Science 2007*, Aalborg, May 8–11.

- Example for a referenced internet source:

Jacet, I. (2007). Nesserland [online], <http://www.inejacet.nl/interviews.html> (accessed October, 24, 2008).

7.18. *Appendix*

The appendix will be an optional structured container of figures, map graphics, tables, source codes, historical reproductions, imagery, etc. The selection gives the reader the opportunity to get a more comprehensive impression of sources that have contributed to the work on the thesis or are outputs of this work, but could not be placed within the main part. If an appendix will be provided it should be accompanied by an appendix content list in the header part of the thesis.