How to write a Bachelor's or Master's thesis

Dr. Harald Selke

22. Februar 2013
The Problem of Writing a Thesis

- What is to be done?
  - Find an interesting topic
  - Narrow down the topic to a question that can be answered within the given time
  - Plan the project: Deadlines, Time management
  - Do your research: Books, Journals, Web, Talks
  - Find a structure: Mind Mapping, Snowflake method
  - Write it all down
  - Present your work
  - Earn the merit and receive feedback

- Mind the tools
  - TeX, Word, OpenOffice, …—whatever you like, but know your software
  - Little helpers: Literature management, versioning, revisions, backup

- Plan ahead and reserve your time
  - Bachelor thesis: parallel to courses, exams, etc.
  - 15 ECTS ⇐ 450 hours
Find an interesting topic

- Topics offered by a research group
  - Overview of current work in a group
  - Topics often well-defined; sometimes limited room for own ideas
  - Supervisor is usually interested in a certain result
- Talking with potential supervisors
  - Development of the topic—takes some time
  - Takes into account your motivation as well as that of the supervisor
  - The better your ideas are, the more interesting will the topic be to you
- Bring your own idea
  - Rather the exception than the rule, yet possible
  - Results often not of particular relevance to the supervisor
  - Students tend to think too big
- Cooperation with a third party
  - Serving to masters
  - Works best if the supervisor is involved in a cooperation with the third party
Narrow down the topic

- Preparation and planning
  - Bachelor thesis: 4 weeks ≈ 90 hours
- Written agreement on exact topic, objectives, and schedule
  - What is the goal of the thesis?
  - Agreement on objectives: about 10 lines
    - Draft by you
    - Final version in coordination with the supervisor
  - Detailed plan: 1–2 pages
    - Which work packages are necessary?
    - Plan the sequence and time needed for each of the packages
- Register the thesis
- Start working immediately
  - Bachelor thesis: 5 months ≈ 360 hours
Plan the project

- Deadlines
  - Be serious about the deadlines for work packages
  - If you do an implementation, define for how long you will work on it
    - in agreement with the supervisor
    - guideline: maximum 50% of the time
  - You will need longer for writing everything down than you anticipate
  - Plan for two weeks at the end for proofreading

- Time management
  - A plan is a plan is a plan—it is meant to change
  - Permanently watch your time management and adjust when needed
    - Keep in mind that delays in a work package are provided for in the new plan
  - When serious problems occur: talk to your supervisor—and do it early
  - Take into consideration: courses, exams, job, term start and end, absence of the supervisor
Find a structure

- Mind Mapping as just one example
- First draft will most certainly be different from the result
- Uncertainty can lead to writer’s block
  - Snowflake method
  - Kompetenzzentrum Schreiben: http://www.uni-paderborn.de/schreiben/
- Meet your supervisor at regular intervals

- How to write a thesis
  - Finding a topic
  - Narrowing down
    - Preparation
    - Objectives
    - Planning
  - Project Planning
    - Deadlines
    - Time management
  - Finding a structure
  - Writing in down
  - Presenting
Working scientifically

- State your questions clearly and enable the reader to follow your arguments
  - State of the art: Where are you starting from?
  - What are the problem and the objectives?
  - Do not make claims, do not make statements.
- Make arguments, give proof or evidence and name your sources.
- Present your solutions and let the reader understand what your achievements are
  - Do not just describe the result.
  - Describe alternatives you considered.
  - Compare your results to those of others.
- Name your methods and why you used them—and not others.
- Draw conclusions and let them have an effect on what follows.
- Be clear in your terminology and know your readers.
### Structure of a thesis

- Title and abstract give you an overview of the thesis.
- The conclusion surveys the results of the presented work.
- The introduction gives you an overview of the context and assumptions.
- The introduction states the main results.
- The introduction describes the structure of the thesis.

<table>
<thead>
<tr>
<th>Title</th>
<th>Abstract</th>
<th>Introduction</th>
<th>Body</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>What is it all about?</td>
<td>Summary and assessment of results</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motivation</td>
<td>Relation to the context</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Definition of the problem</td>
<td>Future work</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Methods used</td>
<td>Reflection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Main results</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conclusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Structure of the thesis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Title and abstract give you an overview of the thesis. The conclusion surveys the results of the presented work. The introduction gives you an overview of the context and assumptions. The introduction states the main results. The introduction describes the structure of the thesis.
Working with Literature:
References

- Give references
  - when quoting a short or long passage from another publication
  - when referring to another publication by summarizing statements, e.g.
  - when interpreting statements from other publications
  - when using other publications to strengthen your point
- Reference the source
  - within the text
    - The notion of an external memory is explained in Keil-Slawik (1990).
    - The notion of an external memory (cf. Keil-Slawik, 1990) …
  - or in footnotes—which should only be used for references and short remarks
- Choose the way of referencing to ease reading and ask your supervisor for their preferences: [42], [GS90], (Gibson, Sterling 1990), …
Working with Literature: Context

- Keep the context of the referenced source in mind and do not distort the statement.
- Always use primary sources, giving precise information on where the statement is to be found—in general this means stating the page.
- Secondary sources may only be used when there is no way of obtaining or understanding the primary source.
  - Clarify that you only read the secondary source!
- Long quotations are rarely necessary. If you need one, format them in a way that the quotation can be easily identified.
- Do not use quotations instead of own statements and arguments.
- Do not alter anything within a quotation with the exception of abbreviations, additions or emphasizing:
  - Identify abbreviations by »…«, additions in square brackets, emphasis by »emphasis in the original« or »emphasis by me«.
- Errors and typos in the source must not be corrected »[sic!]«.
References


References


Online sources:
- Author and Title of the document
- Last date of change (when available)
- Make sure the document will be available to the reader
Some remarks on language

- You are not writing for a computer magazine, nor for a newspaper or a novel.
- You are writing not to express yourself but to make your reader understand what you were thinking when writing your thesis down.
  - Be more or less specific.
  - Who needs rhetorical questions?
  - Contractions aren’t necessary.
  - One-word sentences? Eliminate.
  - Do not use excessively long sentences but use complex sentences whenever the argumentation requires them; your readers are not dumb.
  - If there is a relationship between two arguments, use linguistic means to clarify that relationship instead of letting the reader guess about its nature.
- Always think about your reader:
  - Reading your thesis should be somewhat pleasant.
  - Mistakes are at least annoying to any reader familiar with the rules.

It's is not, it isn't ain't, and it's it's, not its, if you mean it is. If you don't, it's its.
Then too, it's hers. It isn't her's.
It isn't our's either. It's ours, and likewise yours and theirs.
Proper Typesetting

- Typesetting is
  - not a question of art, but one of simple readability of text.
  - not a question of software but a question of professionalism—just like grammar.
- The content determines the layout.
- General guidelines:
  - Be consistent in the use of all elements
  - Align items with the eye not with the ruler.
  - Use as few design characteristics as possible but as many as necessary.
  - Design these elements so that they can be distinguished easily.
  - Be aware of the rules and conventions—down to micro-typography.
Letters

- Typefaces
  - Sans-serif typefaces usually work best for slides and headlines
  - Serif typefaces usually work best for longer texts
  - Combining typefaces is not an easy job

- Often-used type sizes
  - Body 10 to 12 pt
  - Footnotes and long quotations 2 pt less
  - Headlines 24, 18, and 16 pt without any further emphasis
  - Cover-page 36, 48 or 72 pt

- Emphasis by italics; no bold face, no underlining.
Paragraphs

- Do not use a linespacing of 1½.
- But do use 2 to 3 pt leading (Durchschuss) depending on the type size, the length of the lines and the setting.
- Typograhy experts recommend to use no extra space between paragraphs but to use an indent for the first line 0.5 to 0.7 cm.
- Use either justified setting (Blockssatz) or draft setting (Rauhsatz).
- Watch out for maximum word distances in justified setting.
- Linespacing should be larger than the maximum word distance.

Der Zeilenabstand ist größer als der Durchschuss.
New chapter always begins on a right page.

- name of the chapter
- no bold type

Header: 2 cm

Footer: 3.8 cm

Outside margin: 2.5 cm

Inside: 1.5 cm + binding margin: 1 cm

Type area

• page number
The front matters

- Cover page
  - Set headings in type size 36, 48 or 72 pt
  - Organise all elements into 3 groups
    - Title plus subtitle (if any)
    - Type of thesis (Master’s thesis, Seminar paper etc.)
    - Author, affiliation, date
  - Do not use logos if no one requires you to do so.
  - Ask the supervisor and the Prüfungssekreteriat for specific requirements.

- Table of Contents
  - Subsections to third or fourth level maximum.
  - Including page numbers.

- Appendices if necessary:
  - Large tables
  - Source code