3. Different Types of Reports in the Bachelor/Masters Process

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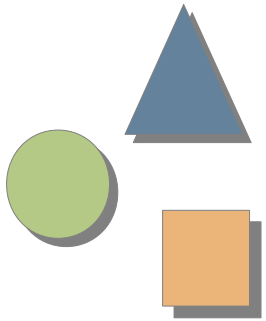
1) Different Types of Reports
2) Outlining
3) Literature Analysis Chapters

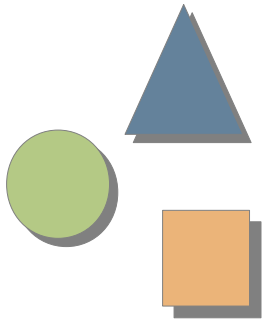


Literature

- Karl-Dieter Bünting, Axel Bitterlich, Ulrike Pospiech. „Schreiben im Studium – Ein Trainingsprogramm“. Cornelsen Verlag. 1. Auflage: 1996, 5. Auflage: 2000
- etwas weniger Material, nicht so gut gelungen:
  - Axel Bitterlich, Ulrike Pospiech. „Schreiben im Studium: mit Erfolg – Ein Leitfaden“. 1.Auflage: 2000, 5.Auflage: 2005
- Umberto Eco, Walter Schick. Wie man eine wissenschaftliche Abschlußarbeit schreibt. In Doktor-, Diplom- und Magisterarbeit in den Geistes- und Sozialwissenschaften (2007). utb-Verlag.
- B. Demuth, H. Hussmann. Hinweise zur Anfertigung wissenschaftlicher Arbeiten. Lehrstuhl Softwaretechnologie, TU Dresden. http://st.inf.tu-dresden.de/home/download/pdf/SWTHinweise.pdf
- [Schreckeneder] Berta C. Schreckeneder. Projektführung für Profis: - Widersprüche und Unterschiede managen - Führung bewusst gestalten - Stärke gewinnen. Hanser-Verlag

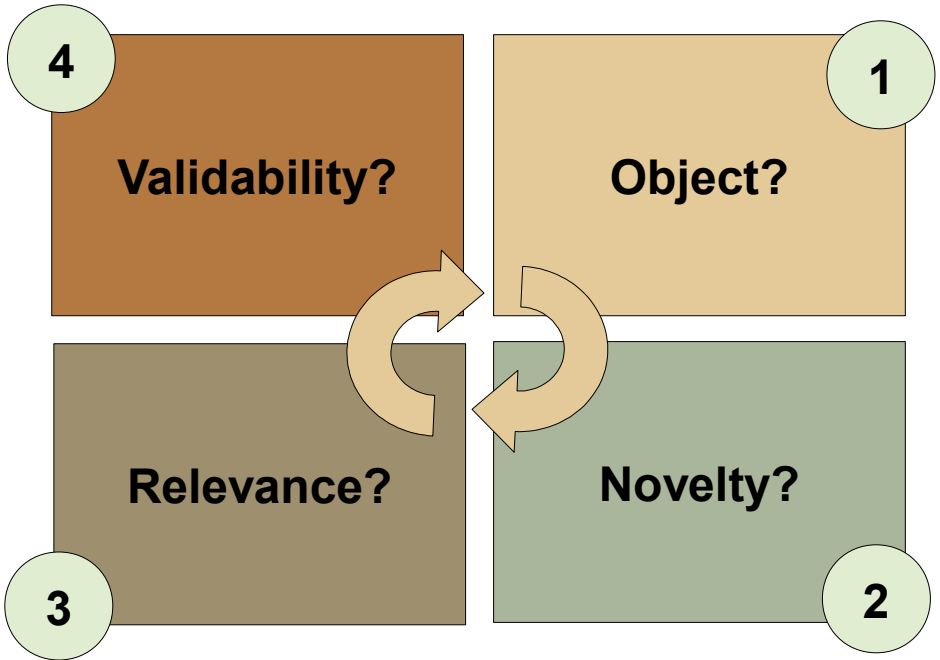
3.1. Different Types of Reports

- The Meeting Protocol
- The Bachelor/Master/PhD thesis
- The Research Paper
- The Research Dossier



Writing Scientific Reports

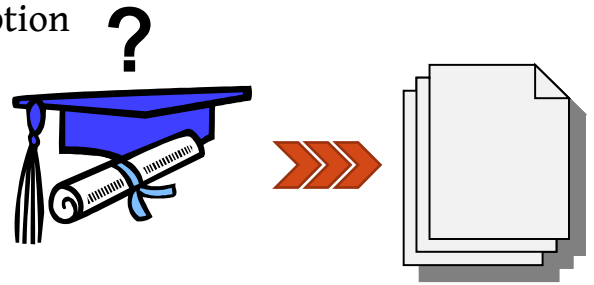
- According to Umberto Eco, all scientific reports must contain 4 components:
- **Object**: The investigation treats a clear, concise, and demarcable concept, idea, or object.
  - Die Untersuchung behandelt einen erkennbaren Gegenstand.
- **Novelty**: The investigation must find out and report *new things, results or contributions,* showing the object from a new point of view
- **Relevance**: The investigation must be useful for other people.
- **Validability**: The investigation's results must be reproducable, i.e., the validation of the investigation must be repeatable (empirical or experimental or deductive).



[Umberto Eco]

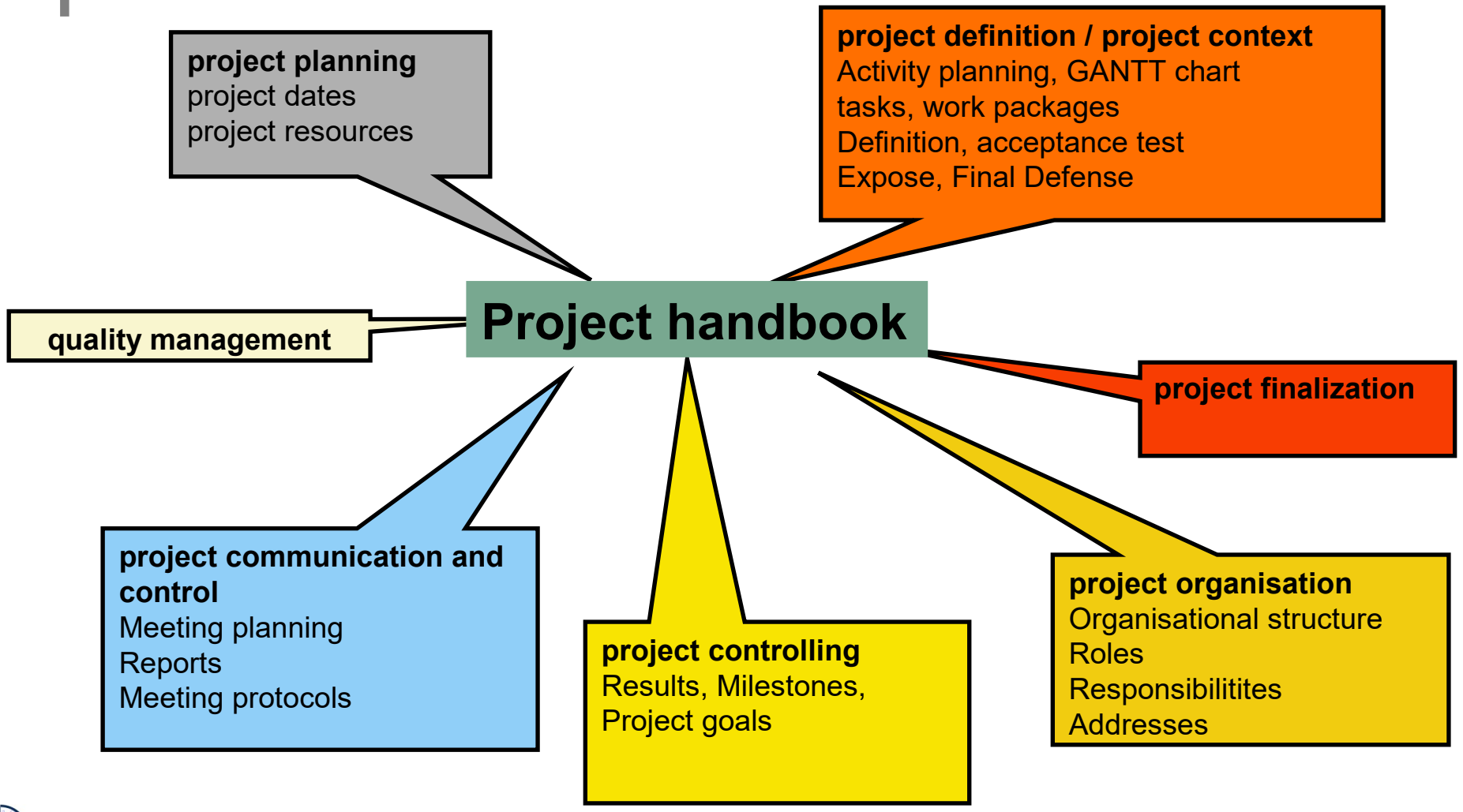
Bachelor Thesis (Belegarbeit) and Master's Thesis (Abschlussarbeit, Diplomarbeit)

- Proof showing that you can work in a scientific way
  - Literature analysis, research results, process..
- Written report for the academic degree
- How to find the topic:
  - Yourself: Advantages and Disadvantages; usually looses some time (only for Master's)
  - From the research group: faster
  - From industry: requirements should be scientific, i.e., a research problem of technical science should exist
- Documents along the way to Master's thesis:
  - Research Exposé
  - Contributions to the research dossier of the group:
    - 1-page research summary
    - 1-page technology demonstrator description
    - Poster
  - Semi-defense
  - Report
  - Final defense



The Project Handbook of a Final Thesis (Projekthandbuch)

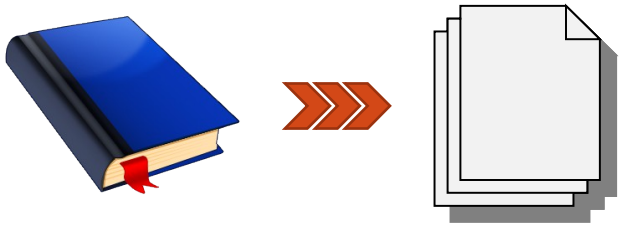
- Start a project handbook at the beginning and assemble all data in it.



[nach B.C. Schreckeneder]

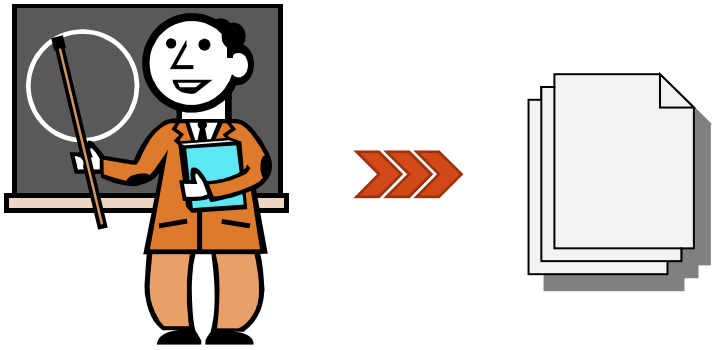
The Excerpt of a Text (Exzerpt)

- Excerpt every paper you read. Excerpting the literature you read is for memoization and reciting (see chapter “Reading”)
  - Without excerpt no report, time for reading is lost
- Write down questions you have
- Try to formulate the main thoughts of a text
- Try to write a summary
  - or a mind map
  - or a concept map
  - or a canvas
- On paper
- On file cards
- On “everynote” on the web



Writing a Bullet Protocol of a Lecture or Meeting (Verlaufsprotokoll)

- Protocol header:
  - Motivation, Location, Time
  - Topic (fill in later)
- Write in keywords/catchwords/bullet minutes
- Use stenographia
- Use arrows to connect different concepts
- Leave a little space to add comments later

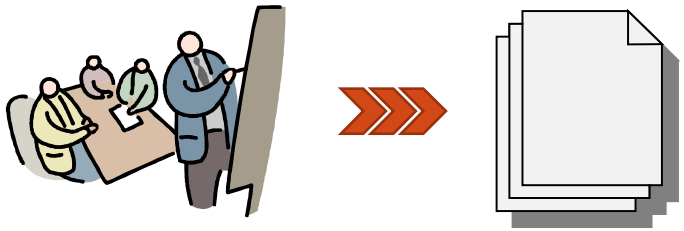


Meeting Result Protocols and Supervisor Meetings

- No meeting without a **result protocol**; a meeting without a protocol is a waste of time
- Public, complete record of results
- Protocol must be acknowledged of the group at the next meeting
  - omissions should be corrected
- Shows the advance of the group process
- **Protocol blog:** Meeting protocols can be written as a *wiki* or *blog*

Supervisor meetings for PhD, Masters and Bachelor students:

- Regular meeting with control of process and objectives
- Write up results, decisions, rationales, otherwise you forget and loose time

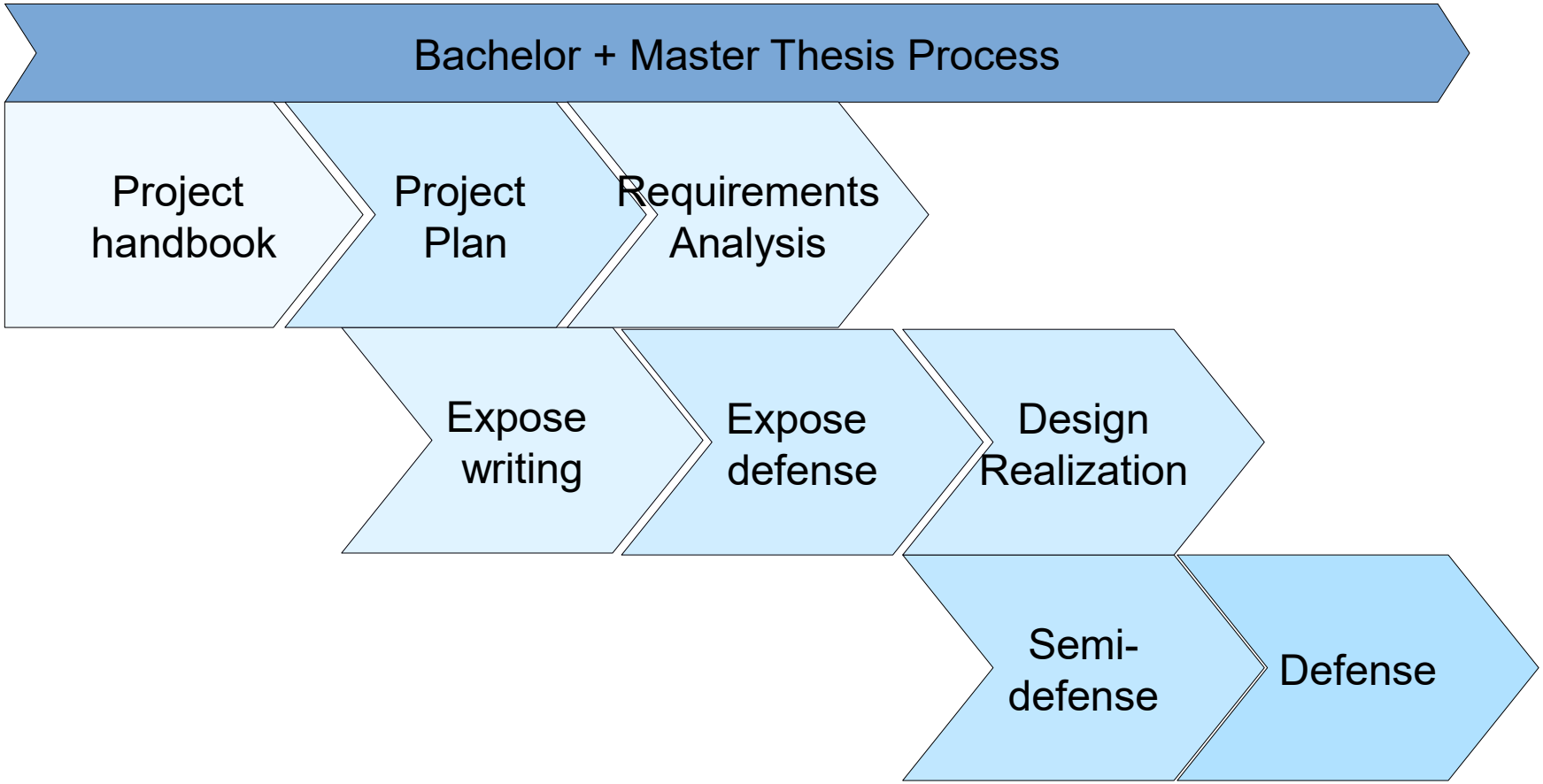


Form of Result Protocol (Ergebnisprotokoll)

- Protocol header:
  - Motivation, Location, Time
  - Participants
  - Chair of meeting
  - Protocolant
- Topic
- Agenda (Tagesordnung)
- Results and decisions according to agenda
- (Signature of protocolant and meeting chair)
- Appendices

Bachelor + Master Thesis Process

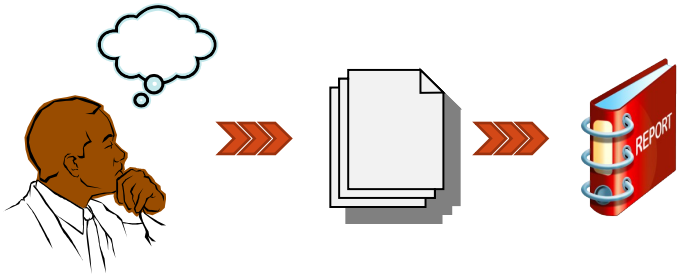
- The Master Thesis Process has more research aspects and is extended in Chap. “Research Process”



What is a Research Proposal (Exposé, Forschungsproposal)?

- At the beginning of her work, every student should write an exposé (research proposal) of 2-10 pages
  - Plans and prepares a Bachelor/Master/PhD thesis
- Length limit for Bachelor: 2 pages; Masters: 3 pages; PhD: 8 pages
- The exposé answers the following questions:
  - What is the profile of the thesis (technical research, literature analysis, empirical, etc.)
  - What is the research problem?
  - What is the research question?
  - What is the relevance?
    - For practical and idealistic research? (see chapter "Science")
    - For basic research, technology research, applied research?
  - What is the topic of work?
  - What is the research result (novelty, contribution)?
  - What is the research method?
  - What is the validation?
- Shows also:
  - Administration (Name, Semester, Program, etc.)
  - Own previous work
  - Preliminary table of contents
  - Roadmap and milestones (net plan, Gantt chart)
  - Discussion of already reviewed literature
  - Important references
  - Important concepts from the literature (glossary)

[Stickel-Wolf/Wolf]



Exposé-Defense

- At the beginning of your process, allocate a “exposé-defense” in the group's seminar
- The Exposé-defense must present the exposé of your work in 5 slides
- Time: 10 min Talk + 15 min Discussion
- Purpose: Present your research plan (see slide on “exposé”)

Semi-Defenses

- At the middle of your process, allocate a “semi-defense” in the group's seminar
- Time of Semi-Defense (ZB) für GrosserBeleg/Master's/DiplomArbeit/ BachelorArbeit: 20 min Talk + 25 min Discussion
- Purpose: Present your status
  - Present your key technology
  - Give overview on state of the art
  - Give your supervisor and the group the chance to comment, to add experience, to help you, to correct wrong ways, to avoid dead ends
- Include
  - Examples of your technology
  - A slide on your progress status with percentages of completion:
    - of the requirements analysis
    - of the literature analysis
    - of the implementation
    - of the report

How to Grade a Bachelor/ Master's Thesis (Example of ST Group)

Bewertung der schriftlichen Arbeit -- Erstgutachter

Kriterium	Gewicht	Note	Gesamt	Begründung
1 Fachliche Qualität (Technical Quality)				
1a. Erfüllung der Aufgabenstellung	3		0,00	
1b. Technische Fehlerfreiheit	3		0,00	
1c. Originalität, eigener Beitrag	3		0,00	
1d. Selbständig erworbenes Fachwissen	2		0,00	
1e. Einbeziehung relevanter Literatur	1		0,00	Teilnote 1:
2 Qualität der Darstellung (Quality of Presentation)				
2a. Klarheit	2		0,00	
2b. Aufgabendefinition, Einleitung	2		0,00	
2c. Gliederung, Argumentation	2		0,00	
2d. Schlussbewertung, Folgerungen	1		0,00	
2e. Erscheinungsbild	1		0,00	Teilnote 2:
3 Prozess (Process)				
3a. Zeitplanung	2		0,00	
3b. Selbständigkeit	2		0,00	
3c. Eigenmotivation	3		0,00	
3d. Berücksichtigung von Vorschlägen	3		0,00	

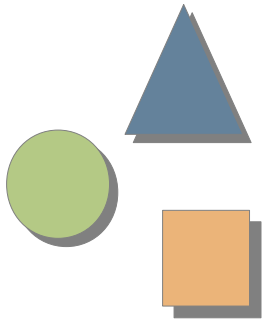
Defense Talks and Disputationes

- Around the time of delivering the report, allocate a “defense” in the group's seminar
- Time of Defense for GrosserBeleg/BachelorArbeit: 20 min talk + 15 min discussion
  - for Master's/DiplomArbeit/ : 30 min talk + 15 min discussion
- Purpose: Present your results
  - Present your key technology
  - Present your scientific progress
- Include
  - Examples of your technology
  - A demo of the technology demonstrator (include this in talk time)
- A defense is a *disputatio, i.e.*, it is allowed to interrupt your talk at any time and ask questions or refute your arguments.
  - Expect discussions!
  - http://en.wikipedia.org/wiki/Disputation

The Nature of a Disputation

- While a *talk* should not easily be interrupted, a disputation *must be* interrupted at any time when a point is disputed and should be discussed.
- Be aware: your professor or opponent can interrupt you any time and ask nasty question.
- Train this!

3.2. Outlining for All Kinds of Reports



General Issues about Reports

- Abstract vs. Introduction
- Summary vs. Conclusion
- Section vs. Paragraph
- Margin notes, footnotes, endnotes
- Tables
  - Tables of Contents
  - Figures
  - Index
  - Bibliography (List of references)
  - Glossary

Headlines

- A headline should introduce:
  - the topic or theme
  - the novelty or scientific contribution
  - the benefit to the reader
- It should be a *controller* with a *controlling idea* (a topic + benefit, see later)

Action-oriented (Handlungsorientiert)

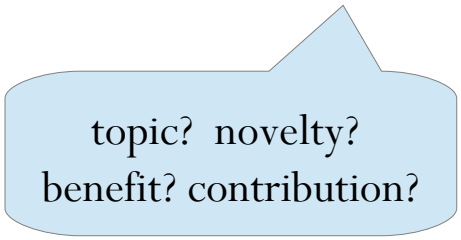
- Schreiben im Studium
- Wissenschaftlich arbeiten
- How to outline an excellent text
- How do I write a readable text?

Concept-oriented (Begriffsorientiert)

- Die Textsorten
- The Protocol and Your Patience
- Das Exposé
- The writer and her mood

Controlling-idea (benefit-oriented)

- Die Vorteile des Essays
- Software Reuse Saves Costs
- When Agile Programming is Desastrous



Avoid Too General Headlines

- Don't structure a text or talk with only "generic" possible headlines, such as

1) Introduction
2) Background
3) State of the Art
4) Conceptualization
5) Optimization
6) Evaluation
7) Conclusion

- This is in deed a possible standard outline, but it is boring.

- Use standard titles at most for Introduction, Background, State of the Art, Conclusion, NOT for your chapters with your own work.
- Much better will be:

1) The World Needs Natural Energy
2) What Natural Energy is About
3) Natural Energy Today
4) Water Pumping Plants as a New Concept for Natural Energy Storage
5) Optimized Pumping
6) Why Pumping is Better than Oil Pumping
7) Conclusion

Write a headline as a controlling idea (see later)

Forms of Outlines

- LaTeX does outlining automatically and very well
- Using Word or OpenOffice is tedious

Hierarchy

1.
2.
2.1
2.1.1
2.1.2
2.2
2.3
3.
…

Parts

Einleitung
Teil A
1.
1.1
1.2
2
Teil B
(…)
Schluss

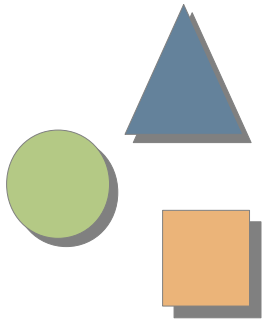
Alpha-numeric Outline

I.
1.
a)
b)
α)
β)
2.
II.
…

Paragraphic Outline

I. Die Schrift (§ 1)
II. Die Zeichen (§§ 2-37)
A. Vokale (§§ 2-6)
B. Konsonanten (§§ 7-25)
C. Ziffern (§§ 26-36)
D. Sonderzeichen (§ 37)
III. Der Satz (§§ 38-51)
A. Hauptsatz (§§ 38-42)
…

3.3 Literature Analysis Chapters



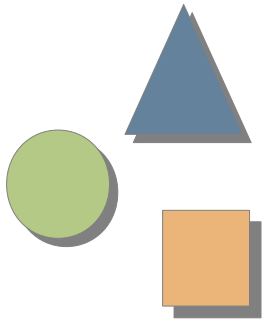
Background vs Related Work

- "Background" chapter: A chapter discussing literature with definitions, results, theorems *necessary to understand your work, your thesis, and your results*
  - usually at the front, e.g., Chapter 2 or 3
- "Related Work" chapter: A chapter for discussing literature with *results related to your work*
  - highlighting differences
  - highlighting different frame conditions
  - highlighting the limits of other approaches
  - usually at the end, e.g., Chapter 7, or at the end of each chapter
  - Sometimes, "Related Work" can also be a chapter after the "Background" chapter, e.g., Chapter 3
    - In this case, the chapter shows the limits of related work and, by this, motivates the own work to be described in the succeeding chapters

Analyzing Overview Papers (Homework)

- An **overview paper** is a paper analyzing the state of the art in a field, or the literature. Every thesis has to have at least one overview chapter, similar in structure.
- To prepare, we should analyze several overview papers:
  - Steve Vinoski. An overview of middleware. In Albert Llamosí and Alfred Strohmeier, editors, Reliable Software Technologies - Ada-Europe 2004, volume 3063 of Lecture Notes in Computer Science, pages 35-51. Springer. Berlin / Heidelberg, 2004. 10.1007/978-3-540-24841-5_3.
  - Tim Sheard. Accomplishments and research challenges in meta-programming. In Walid Taha, editor, Semantics, Applications, and Implementation of Program Generation, volume 2196 of Lecture Notes in Computer Science, pages 2-44. Springer Berlin / Heidelberg, 2001. 10.1007/3-540-44806-3_2.
  - Mazeiar Salehie and Ladan Tahvildari. Self-adaptive software: Landscape and research challenges. ACM Trans. Auton. Adapt. Syst., 4(2):14:1-14:42, May 2009.
- Questions to answer:
  - Find the papers on the web
  - Compare their table of contents
  - Can you find a pattern for a structure of an overview paper?
  - Read the paper with the most important structure

3.4 Scientific Research



Criteria for a Master's Thesis

- A Master's thesis should prove:
- The candidate is a master of (software) engineering
  - He can build software systems that are of high quality
    - with quality management, test suite, good documentation
  - Appropriateness hypothesis: The system solves a certain task (is good for a certain task)
    - Test suite indispensable
- The candidate knows how to achieve a technical science result
  - Automation hypothesis: The candidate shows the first time how to automate the solution of a problem
  - Optimization hypothesis: The candidate shows how to improve the automation of the solution of a problem

The End