

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

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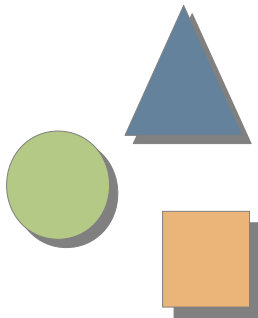
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<http://st.inf.tu-dresden.de/teaching/asics>

Lecturer: Dr. Sebastian Götz

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



- ▶ Karl-Dieter Bunting, 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



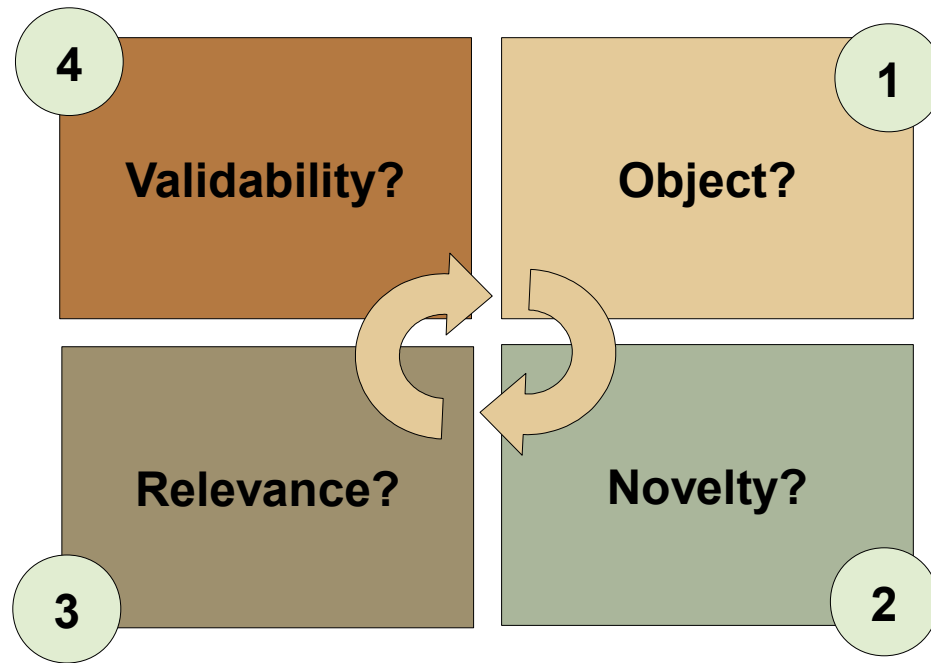
3.1. Different Types of Reports

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

Writing Scientific Reports

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- ▶ 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 reproducible, i.e., the validation of the investigation must be repeatable (empirical or experimental or deductive).

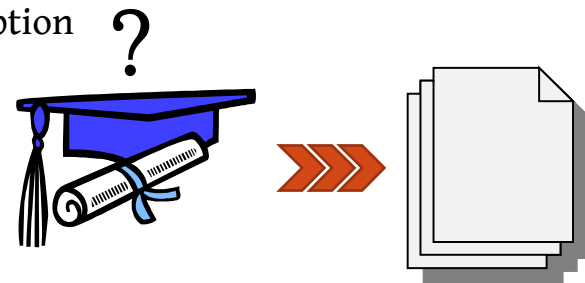


[Umberto Eco]

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

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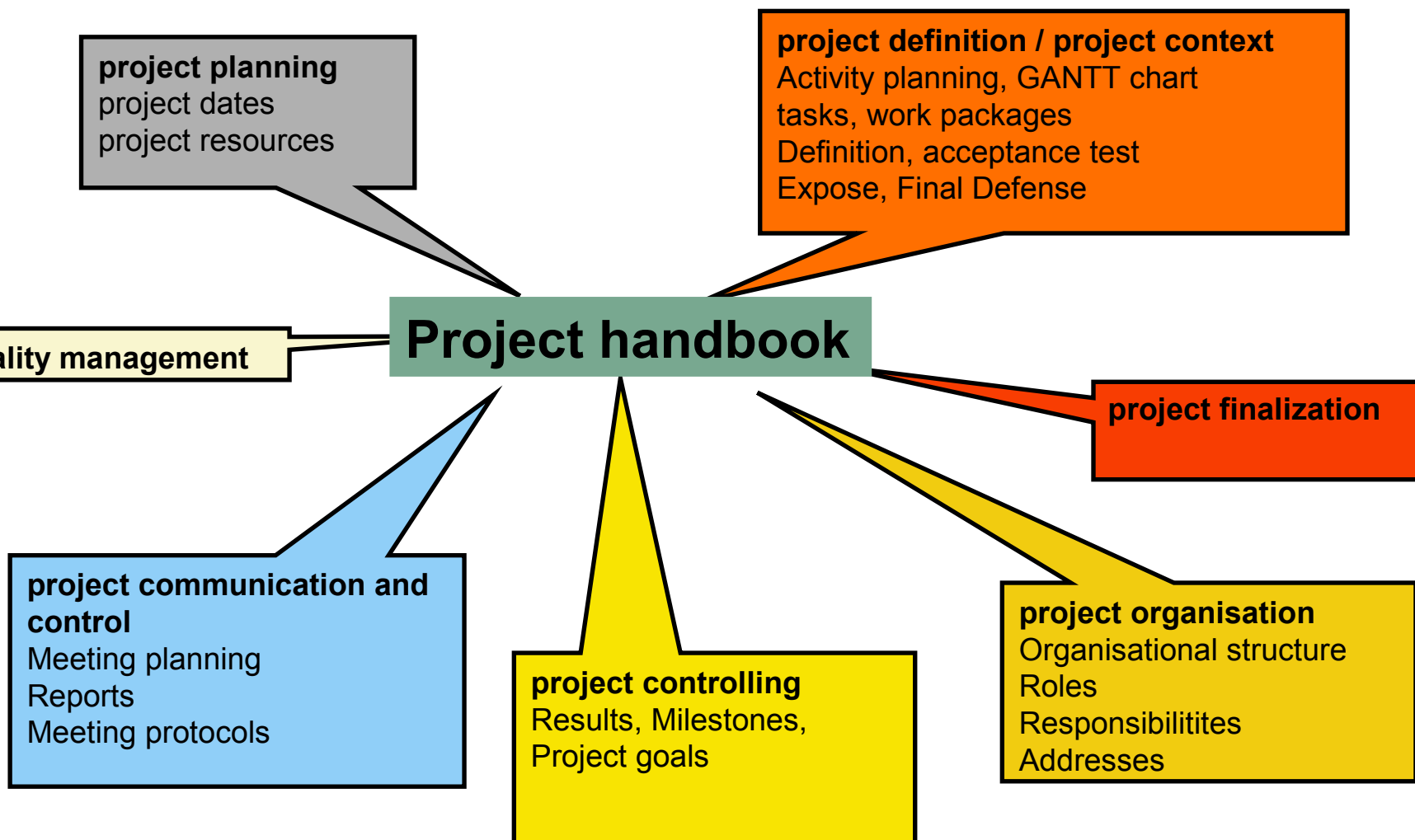
- ▶ Proof showing that you can work in a scientific way
 - Literature analysis, research results, process..
- ▶ Written report for the academic degree
- ▶ How to find the topic:
 - Yourself: Advantages and Disadvantages; usually loses some time (only for Master's)
 - From the research group: faster
 - 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)

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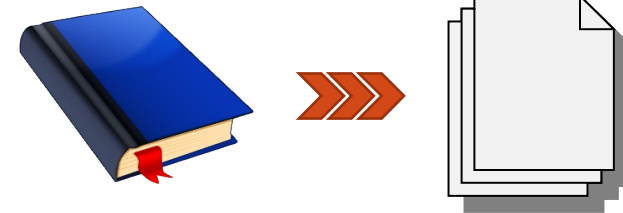
- ▶ Start a project handbook at the beginning and assemble all data in it.



The Excerpt of a Text (Exzerpt)

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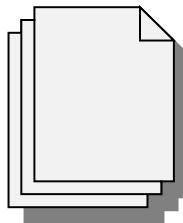
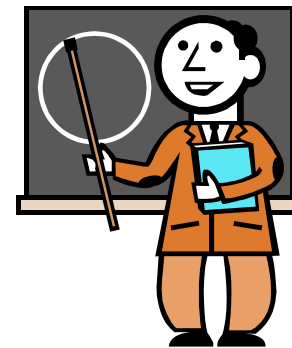
- ▶ Excerpt every paper you read. Excerpting the literature you read is for memoization and reciting (see chapter “Reading”)
 - Without excerpt no report, time for reading is lost
- ▶ Write down questions you have
- ▶ Try to formulate the main thoughts of a text
- ▶ Try to write a summary
 - or a mind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

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- ▶ 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



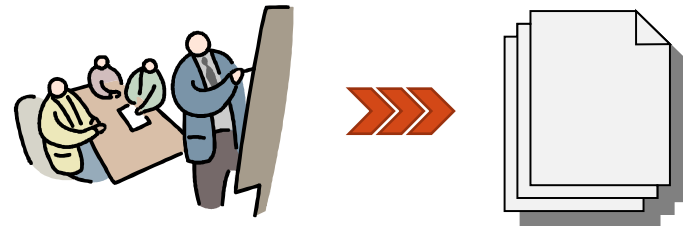
Meeting Result Protocols and Supervisor Meetings

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- ▶ 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





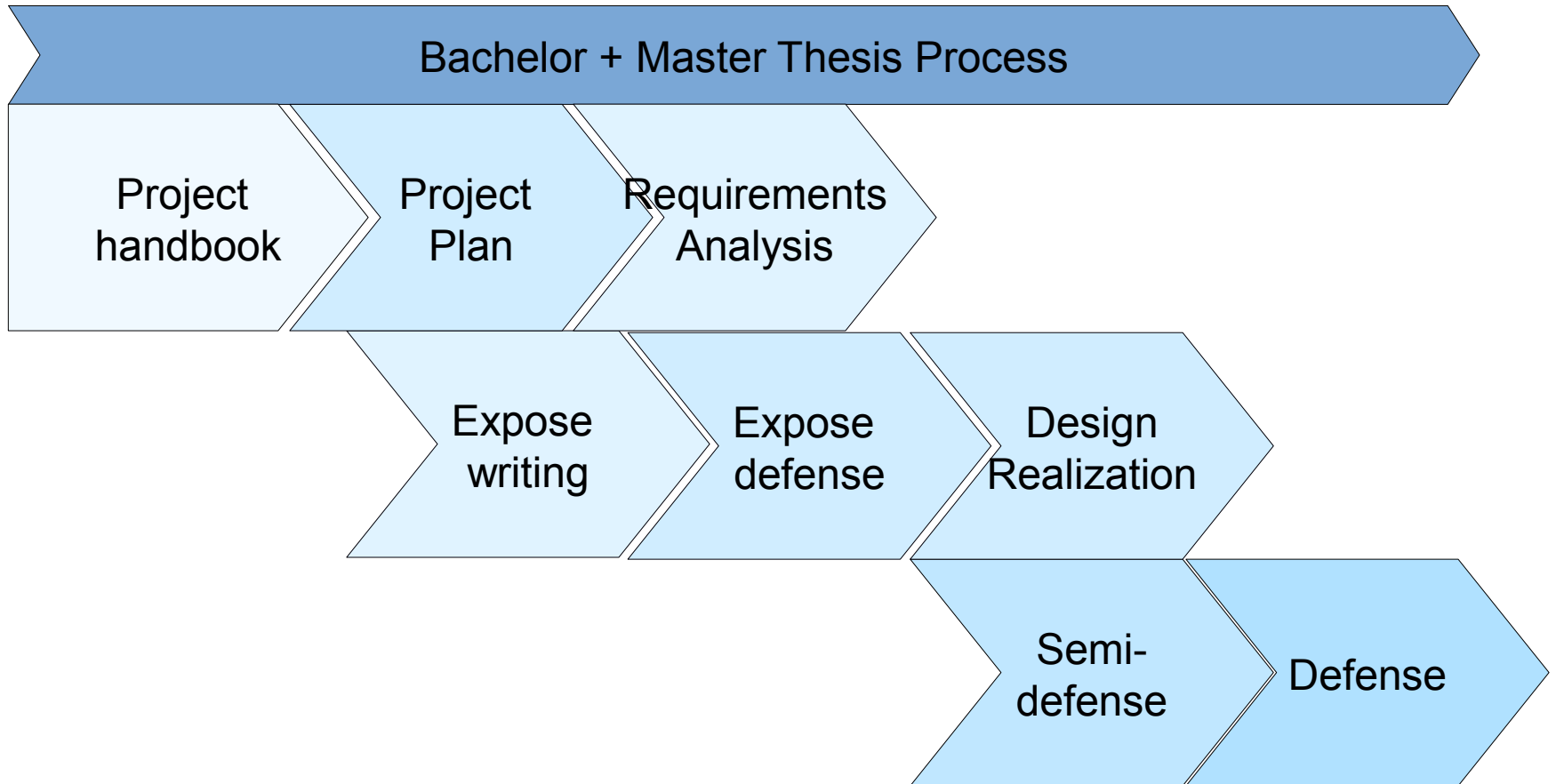
Form of Result Protocol (Ergebnisprotokoll)

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- ▶ 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”

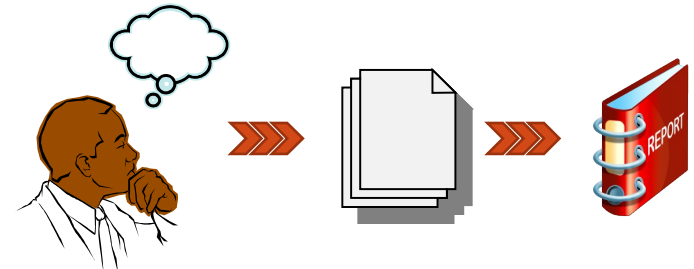


What is a Research Proposal (Exposé, Forschungsproposal)?

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- ▶ 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

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- ▶ 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”)

- ▶ 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 Disputations

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- ▶ 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

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- ▶ 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

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

- ▶ 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

topic? novelty?
benefit? contribution?

Avoid Too General Headlines

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- ▶ 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” 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)

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- ▶ 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
 - Decide on a structure for your paper in your group.

3.4 Scientific Research



Criteria for a Master's Thesis

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- ▶ 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

