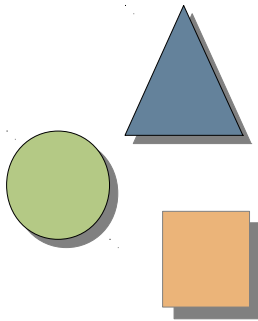


03. Different Types of Reports in the Bachelor/Masters Process

Prof. Dr. Uwe Aßmann
Softwaretechnologie
Fakultät Informatik
Technische Universität Dresden
2015-1.1, 16.04.15
<http://st.inf.tu-dresden.de/asics>

- 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



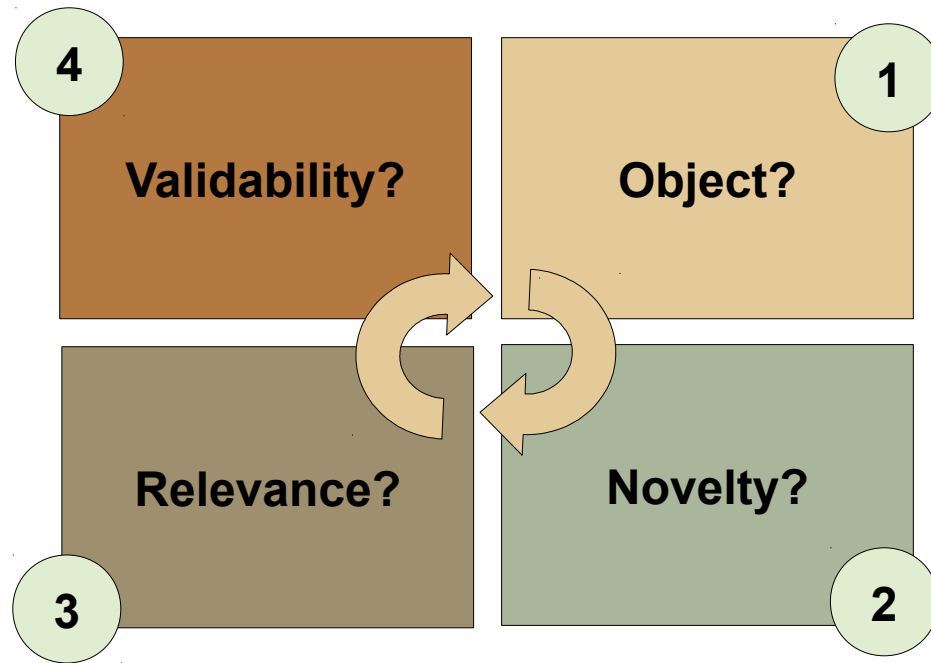
03.1. Different Types of Reports

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

Writing Scientific Reports

4

- ▶ 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).

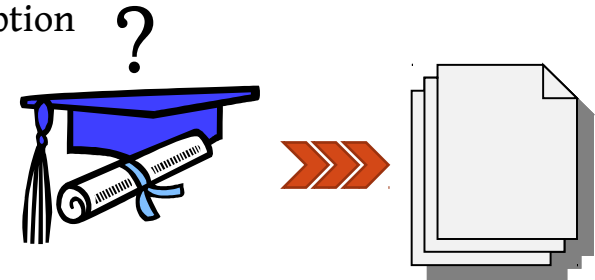


[Umberto Eco]

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

5

- ▶ 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)

6

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

project planung
project dates
project resources

project definition / project kontext
Activity planning, GANTT chart
tasks, work packages
Definition, acceptance test
Expose, Final Defense

Project handbook

quality management

project finalization

project communication and control
Meeting planning
Reports
Meeting protocol

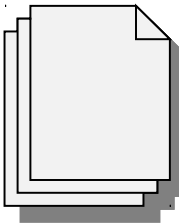
project controlling
Results, Dates, Milestones
Resources, costs,
Project goals

project organisation
Organisational structure
Roles
Responsibilitites
Addresses

The Excerpt of a Text (Exzerpt)

7

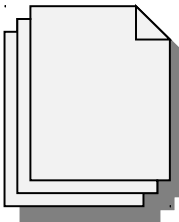
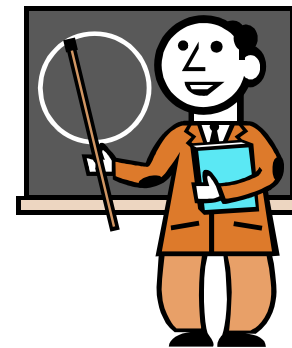
- ▶ Excerpt every paper you read. Excerpting the literature you read is for memoization and reciting (see chapter “Reading”)
 - Without excerpt no report, time for reading is lost
- ▶ Write down questions you have
- ▶ Try to formulate the main thoughts of a text
- ▶ Try to write a summary
 - or a mind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

8

- ▶ 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

9

- ▶ 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



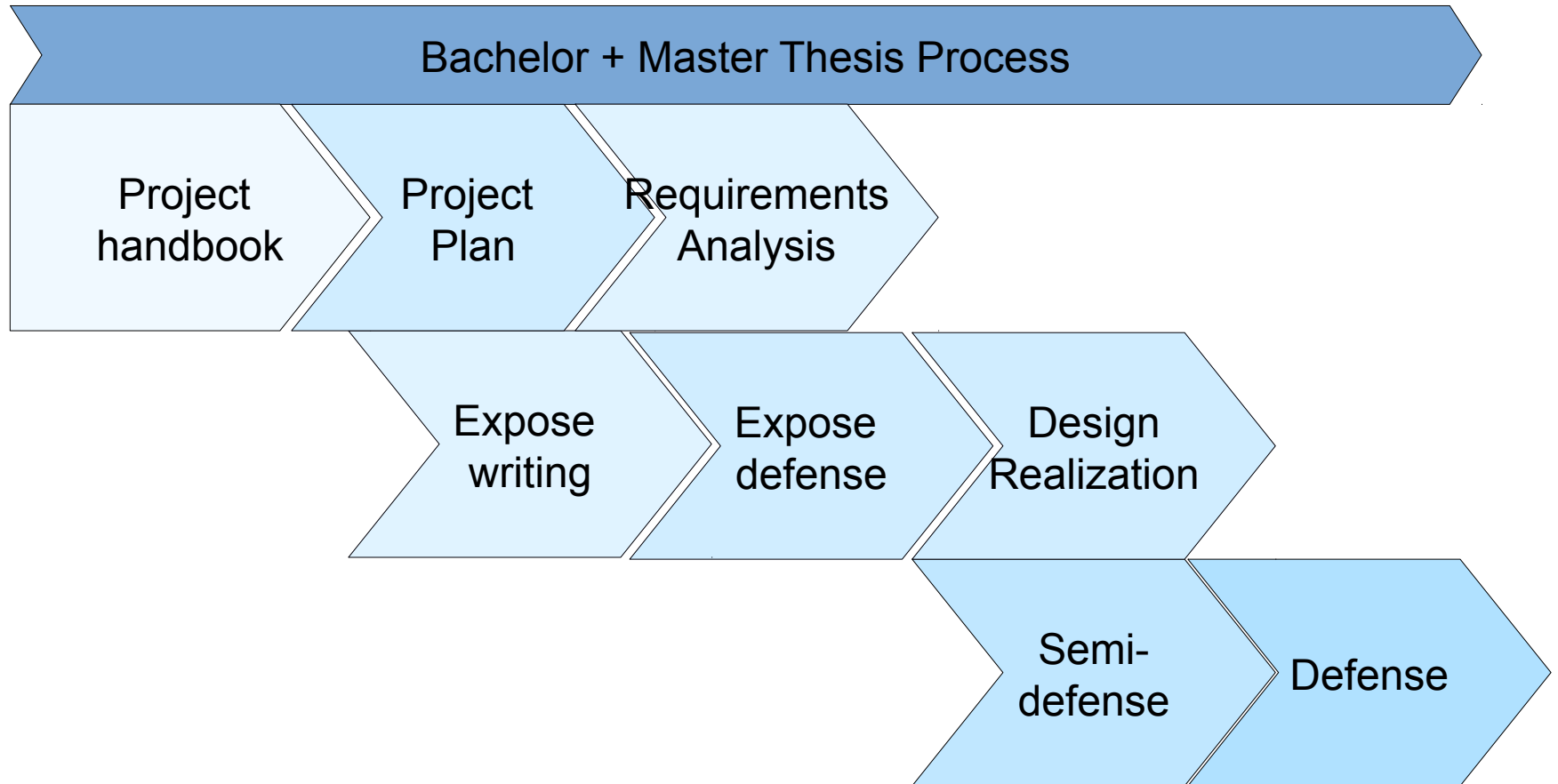
Form of Result Protocol (Ergebnisprotokoll)

10

- ▶ 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”

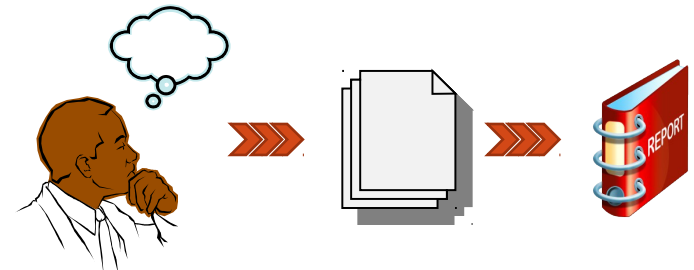


What is a Research Proposal (Exposé, Forschungsproposal)?

12

- ▶ 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

13

- ▶ 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

16

- ▶ 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!

03.2. Outlining for All Kinds of Reports



General Issues about Reports

19

- ▶ Abstract vs. Introduction
- ▶ Summary vs. Conclusion
- ▶ Section vs. Paragraph
- ▶ Margin notes, footnotes, endnotes
- ▶ Tables
 - Tables of Contents
 - Figures
 - Index
 - Bibliography (Table 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?

topic? novelty?
benefit? contribution?

Avoid Too General Headlines

21

- ▶ 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 only 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)
- ...





Paragraphs and Headlines

23

Law of Paragraph Headline:
Never write a paragraph without invisible headline.

Law of Paragraph Question:
Never write a paragraph without invisible question you answer in the paragraph.

03.3 Literature Analysis Chapters



Background vs Related Work

25

- ▶ “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

Analyzing Overview Papers (Homework)

26

- ▶ 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 with the RIK process
 - Decide on a structure for your paper in your group.

03.4 The Scientific Research

Criteria for a Master's Thesis

28

- ▶ 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)
 - <http://homepages.inf.ed.ac.uk/bundy/how-tos/writingGuide.html>
 - Test suite indispensable
- ▶ The candidate knows how to achieve a technical science result
 - <http://homepages.inf.ed.ac.uk/bundy/howToGuides.html>
 - <http://homepages.inf.ed.ac.uk/bundy/how-tos/note1144.pdf>
 - 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

