34. Revising and Reviewing a Research Paper

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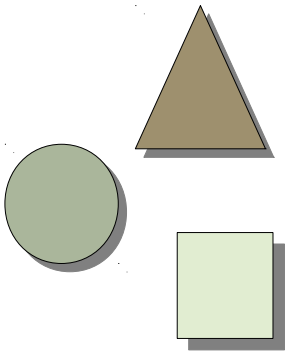
1) Choosing your paper type
2) Choosing a structure
3) Hints for writing
4) Revising
5) Reviewing
6) Grading



- see also Chapter “Special paragraphs and sections”

Obligatory Literature

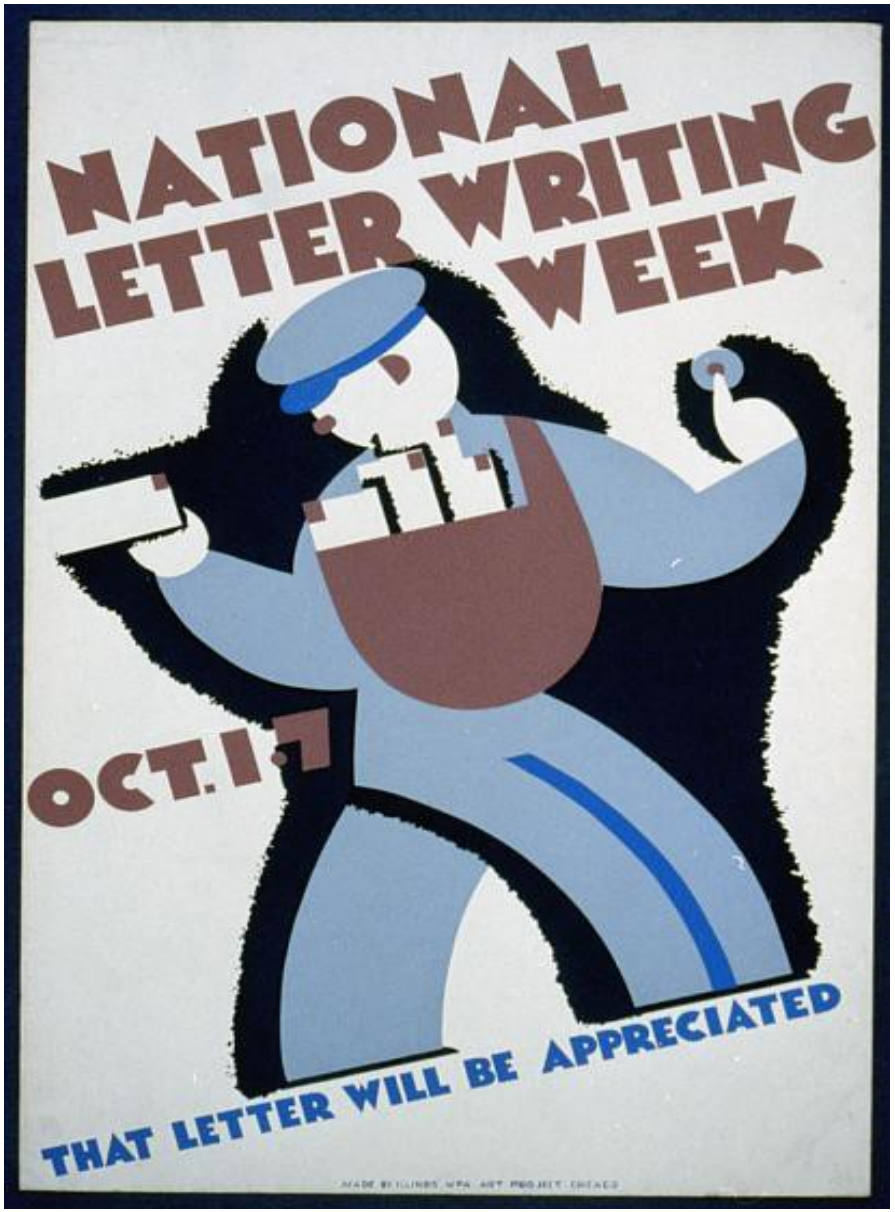
- [Davis] Hugh Davis. How to Review a Paper: A guide for newcomers and a refresher for the experienced. V2.0 16th Jan 2007
  - http://users.ecs.soton.ac.uk/hcd/reviewing.html
- PDF corrections with Acrobat Reader
  - http://www.sagepub.com/repository/binaries/manuscripts/PDFcorrections.pdf
- [Gonzalez] Fabio A. Gonzalez. Writing a Research Paper Depto. de Ing. de Sistemas e Industrial Universidad Nacional de Colombia, Bogota

Other Literature

- Christine Stickel-Wolf, Joachim Wolf: Wissenschaftliches Arbeiten und Lerntechniken. Erfolgreich studieren – gewusst wie! Gabler, 5., aktualisierte und überarbeitete Auflage 2009
- [UNC] The Writing Center, University of North Carolina at Chapel Hill. Proof reading roles:
  - http://writingcenter.unc.edu/files/2012/09/Editing-and-Proofreading-The-Writing-Center.pdf
- How to review a journal article
  - https://academicskills.anu.edu.au/sites/default/files/handout_pdfs/Writing%20a%20journal%20article%20review%20[new].pdf
- O Nierstrasz. Identify the champion. Pattern Languages of Program Design, 2000. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.77.3459&rep=rep1&type=pdf
- http://thatsmathematics.com/blog/archives/102 the wonderful story how a generated paper was accepted in a mathematical journal...
- http://pdos.csail.mit.edu/scigen/
- http://thatsmathematics.com/mathgen/
- Satirical submission which was accepted
  - http://www.physics.nyu.edu/faculty/sokal/lingua_franca_v4/lingua_franca_v4.html

Other Literature

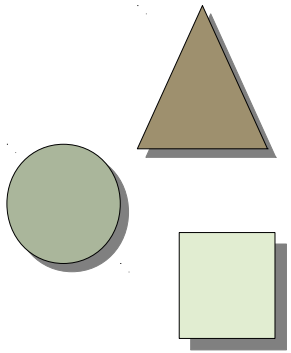
- Marc E. Tischler. Scientific Writing Booklet. Dept. of Biochemistry and Molecular Biophysics. University of Arizona. http://www.biochem.arizona.edu/marc/Sci-Writing.pdf
- Mark Ashby. How to Write a Paper. Engineering Department, University of Cambridge, Cambridge 6rd Edition, April 2005 http://www-mech.eng.cam.ac.uk/mmd/ashby-paper.pdf



- Alan Bundy:
- Informatics is an *engineering science*. Like other branches of both engineering and science it contributes to the advancement of knowledge by formulating hypotheses and evaluating them. It is not enough merely to describe some new technique or system; some claim about it must be first stated and then evaluated. This claim has the status of a scientific hypothesis; the evaluation provides the evidence that will support or refute it.

34.1 Determine Type of Paper

with the Shaw Classification of Papers

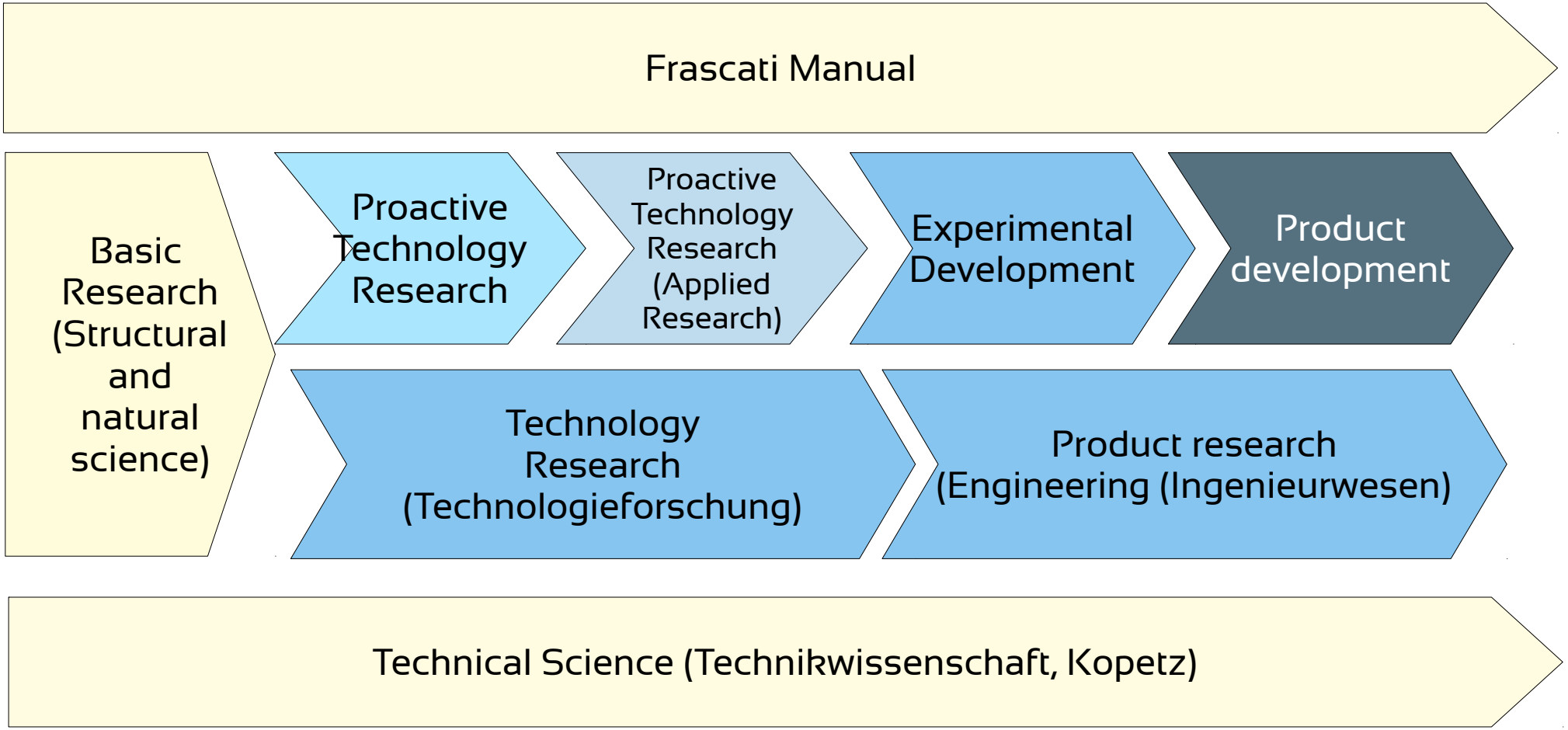


Which Type of Paper?

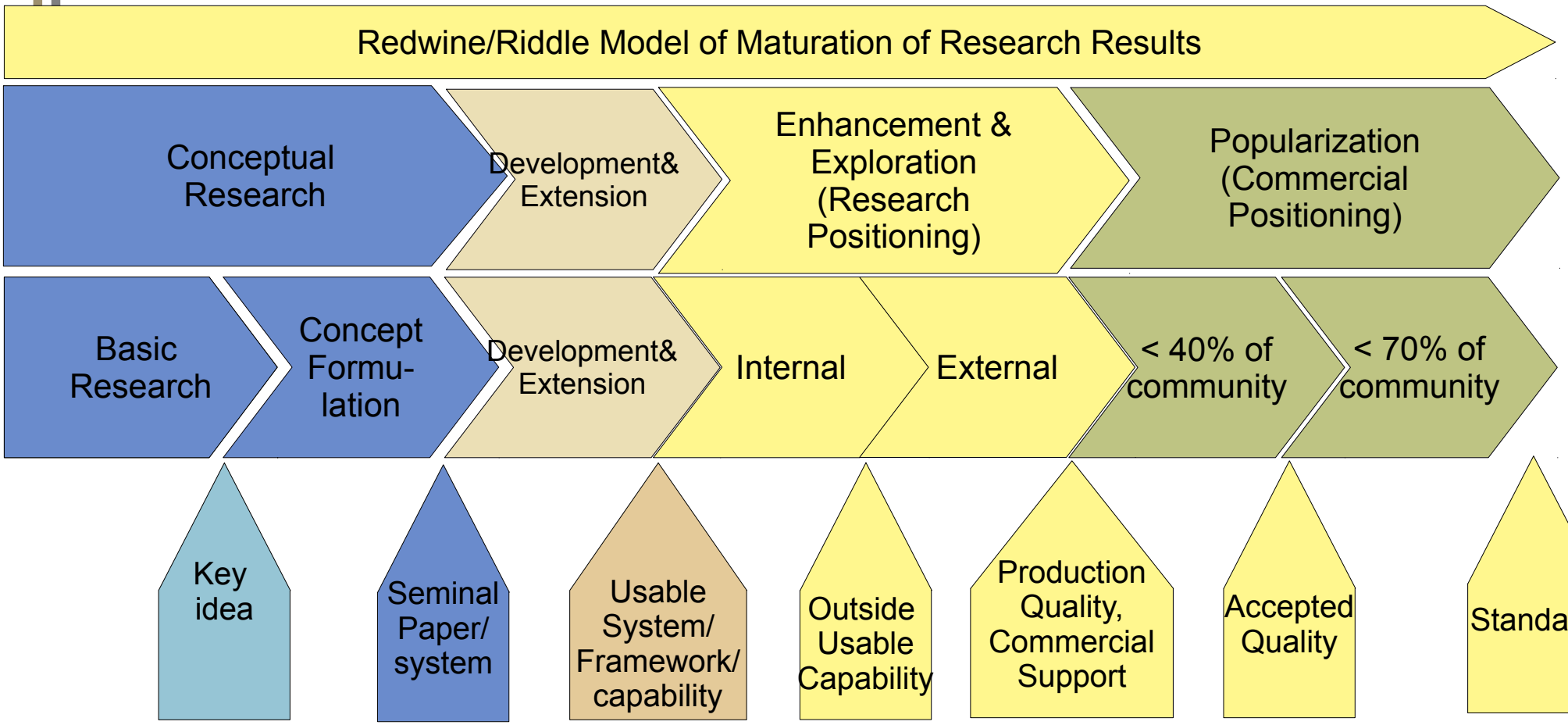
- Which type of science [Tedre]
  - Structural research (mathematics, theoretical computer science)
  - Technical, engineering research
  - Empirical research
- Which phase of technical science? (Kopetz, Frascati Manual)
  - Basic research
  - Technology research
  - Product research
- Which type of maturity phase [Redwine-Riddle]
  - basic research
  - conceptualization
  - enhancement, exploration
  - popularization

Technology Research (Technologieforschung)

- According to Frascati Manual and Kopetz
- Technology research can be *proactive* or *reactive*



Redwine-Riddle Model of Technology and Research Maturization



Which Paper Pattern?

- Which type of hypothesis [Shaw]
  - Many types result from the Shaw classification on Research Questions
  - Choose question, method, success criterion, result, valuation, limit
- Which type of problem-solving paper (Enhanced Solution, POPP)
  - ZOPP, PROBLOSS, BATEID-PROBLOSS
- Other Newman types
  - Enhanced model
  - Radical solution
- Type of research thesis and result
  - automating
  - enhancing (olympic, efficiency)
  - Identify main result
- Decomposition of thesis into components (subtheses), becoming controlling ideas of sections

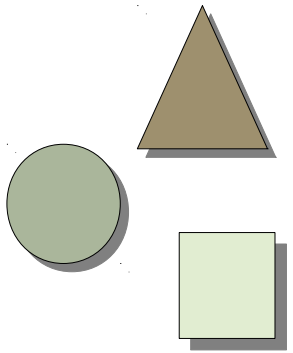
Determine Maturization Level with Regard to Research Hypothesis

- According to Redwine/Riddle model of research maturization, determine the level of the paper:
  - Basic research on ideas
  - Concept formulation
  - Enhancement and Exploration
  - Popularization
- Be aware, that research questions, success criteria, result, validation, and limit can be quite different

Shaw-Redwine-Riddle matrix	Research question	Success criteria	Research result	Validation	Limit
Basic research					
Concept formulation					
Enhancement Exploration					
Popularization					

- [Curie]
- <result>Ich habe die Intensität der Uranstrahlen mittels der Leitfähigkeit der Luft gemessen. Die Methode der Messungen wird weiter unten auseinander gesetzt werden. Die erhaltenen Zahlen beweisen die Konstanz der Strahlung innerhalb der Genauigkeitsgrenzen der Versuche, d. h. auf 2 bis 3 Proz.[13]
- <method>Zu diesen Messungen wurde eine Metallplatte benutzt, die mit einer Schicht von Uranpulver bedeckt war. Die Platte wurde nicht in der Dunkelheit aufbewahrt, da dies nach den oben angeführten Beobachtungen ohne Einfluß ist.
- <validity>Die Zahl der mit dieser Platte ausgeführten Beobachtungen ist sehr groß und erstreckt sich gegenwärtig auf einen Zeitraum von fünf Jahren.

34.2 Typical Structures of Papers



[Gonzalez] Paper Structure (Sections)

- **Title**: should already contain the controlling idea (thesis)
- **Attribution**: Author list, ev. with footnotes on supporting research organizations
- **Abstract** e.g., with MOPARC
- **Introduction** should follow a ZOPP-like problem analysis
  - Paragraphs with Background, Problem, Success criteria, Research Question, Research Method, Research Result, Solution: Way how to achieve the result, Roadmap
- **Background**: Terminology, background works
- **Solution**
  - Depends on the type of research question, method
- **Validation**, e.g., Experimental evaluation: what are the findings of the experiments or analyses?
- **Discussion**: Discuss advantages, disadvantages, limits, unique features
- **Comparison** to Related Work: what is the unique feature of the result?
- **Conclusion**: Draw a conclusion
- **Acknowledgement**: Often, research funding organizations want to be acknowledged. Do also not forget helpful colleagues or your supervisor
- **References**
- **Appendices**

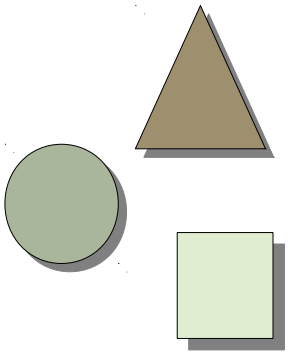
Shaw's Paper Structure *(Sections)*

- http://spoke.compose.cs.cmu.edu/write/t/d/std-otl.htm
- **Abstract**
- **Introduction** (with motivation, problem definition, research question, overview/roadmap of the paper)
- **Related work A** (Background: what is necessary to understanding the present result)
- **Meat of the paper** (the part of the structure that depends on the result; pretty different)
- **Related work B** (relations to other work that compare this work to alternatives or otherwise require the present result as a prerequisite)
- **Summary**, **conclusions**, next steps
- **Acknowledgements**, in partiular funding sources
- **Bibliography**
- **Possibly appendices** (the standard rule for appendices places them after the bibliography, which is a nuisance)

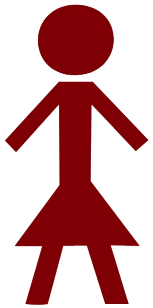
Bundy's Paper Structure

- http://homepages.inf.ed.ac.uk/bundy/how-tos/writingGuide.html
- **Title** should summarize the hypothesis (thesis, contribution) of the paper. The “controlling idea” must shine out
- **Abstract** state the contribution
- **Introduction** motivate the contribution of the paper
- **Literature Survey** allows for positioning the paper into the context
- **Background** (Background: what is necessary to understanding the present work)
- **Theory**
- **Specification**
- **Implementation**
- **Evaluation**
- **Related work** comparison with competitors
- **Further Work**
- **Conclusion**
- **Appendices**

34.3 Roles of the Writing and Revision Process

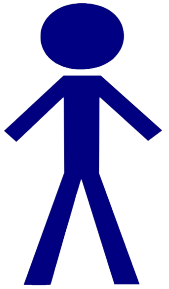


Roles in Writing and Reviewing

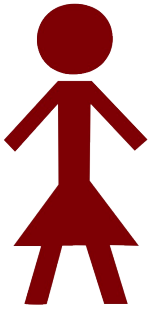


Introduction and conclusion writer

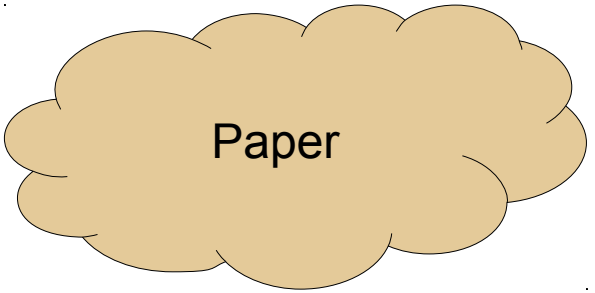
Paper leader

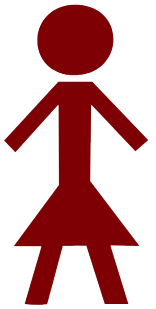


Crossreader (Proofreader)



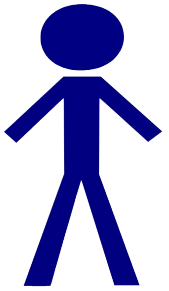
Section writer





Skeletonizer (controlling idea)

Research Contribution



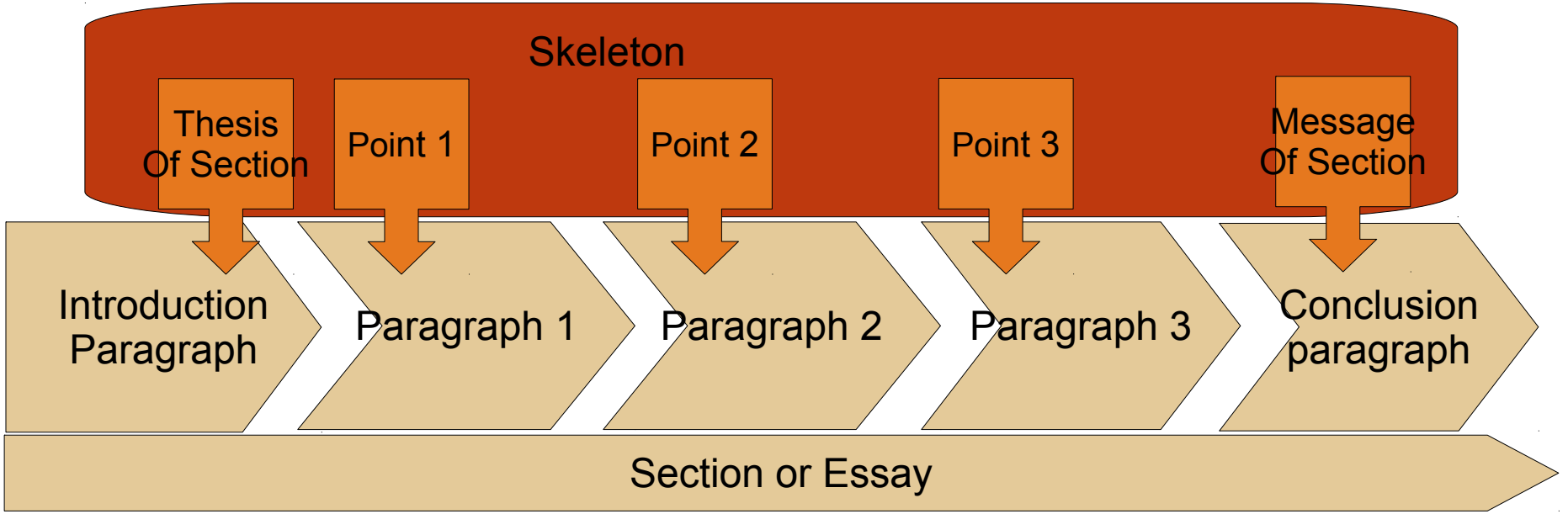
The Skeleton of a Paper

- [Franklin-Parks]
- Start with an Outline
- Write Paragraph Questions (thesis questions) and Controlling Ideas first, before writing the text
  - **Controlling Idea = Topic + Benefit**
  - Controlling idea is the answer to the thesis question
- The skeleton of the paper is the set of controlling ideas of all sections and all paragraphs.
- If you write the text before the skeleton is stable, the text will have to be rewritten

Law of unstability:
As long as you do not have a stable skeleton, the paper text will be unstable

Skeletons

- The **skeleton** of a section is the sequence of all points of all paragraphs.
  - The skeleton is an abstraction of the text
- If it is marked and extracted from the section, it forms the **skeleton paragraph.**
- The skeleton results from Point maturization, Support analysis, and Skeleton maturization
- A section (or essay) has unity if all points of the paragraphs support its thesis.

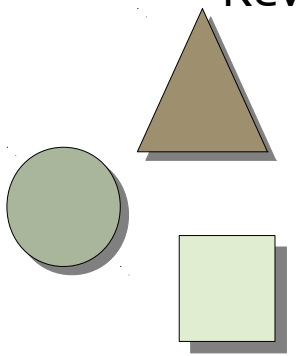


LaTeX Help

- Package **todonotes.sty**
  - Typesets colored margin notes with comments of the proofreader
  - Assembles a list of todos in a special table (e.g., at the end of the paper)
- **bclogo.sty**: nice icons for smileys, warnings, signs, construction sites, etc
- **chbar.sty** for marking starts and ends of changes of an author
- LyX tool
  - provides author-specific change marks in different colors
  - reads LaTeX text in

34.4 Revision

- Grammatical Revision
- Proofreading
- Revision for Conciseness
- Revision for Unity (Skeletons)
- Revision for Coherence



Aßmann's Revision Hints (Results of Proofreading)

Abbreviations in Margin Comments

- **|** A simple bar indicates a simple mistake, e.g., a comma omission.
- **?** This sentence is unclear; I cannot understand it; please explain and improve
- **U** Unclear. What did you mean here? Rephrase, simplify.
- **n.d.** term is not defined. Insert a definitory sentence
- **tt** Use typewriter font
- **em** Use emphasized font
- **u.b.d** term used before defined. Either remove the term, or introduce a definition
- **def** Introduce a clear definition here, either a definitory sentence, or a definition paragraph.
- **rpt.** Repetition; check earlier on for a similar sentence or paragraph
- **Inc.** Inconsistent. This is mostly coupled to an arrow or link, which indicates the inconsistent definition or use
- **E** English expression is ill
- **G** Germanism
- **S** Style is to be improved
- **lz** lazy sentence: is not used anymore, not useful. Wipe out.
- **co** Too complex, simplify.

Proofreading Yourself

- [UNC] General Rules:
  - Get some distance from the text!
  - Decide what medium lets you proofread most carefully.
  - Try changing the look of your document. (different font, size, formatting)
  - Find a quiet place to work.
  - If possible, do your editing and proofreading in several short blocks of time, rather than all at once—otherwise, your concentration is likely to wane.
  - If you're short on time, you may wish to prioritize your editing and proofreading tasks to be sure that the most important ones are completed.
  - Proofreading is a learning process.
- Proofreading rules:
  - Don't rely entirely on spelling checkers, as well as grammar checkers..
  - Read the paper for spell checking backwards.
  - Proofread for only one kind of error at a time.
  - Read slow, and read every word.
  - Separate the text into individual sentences.
  - Circle every punctuation mark.

Grammatical Revision

- Spellchecking: Don't forget the automatic spell check.
- **Best**: do it incrementally (Work, OpenOffice, Lyx)
- **Second best:** use interactive spellchecking (Emacs, Lyx, ..)
- **Third best:** use a batch spell checker
- For every forgotten spell check, your supervisor deserves a beer, because **you should not forget this easy step.**

Conciseness Revision

- Read the paper to *simplify* sentences
- Try to make expressions more *concise*
- Eliminate *meta-speak*, sentences about other sentences

Advice from [Gonzalez] for Conciseness Revision:

•Read the paper at least 2 or 3 times (it may be useful to make it aloud):
•Does it say what you wanted to say?
•Do you need to change the order of ideas, experiments, results, interpretations in order to improve the flow of the text?
•Can you make some phrases shorter to make them clearer?

Skeleton Revision (for Unity)

- Text Skeleton reviewing and revision
  - The author should phrase the *thesis question* for every paragraph which is answered in the paragraph
  - If she cannot formulate a thesis question, the paragraph is not coherent → must be rewritten
- All sentences must answer the thesis question!

Revision for Coherence

- All sentence must contain *links* to other sentences (coherence)
  - demonstrative pronouns
  - personal pronouns
  - synonyms, homonyms

Crossreading by an Opponent

- Before a paper is sent to a conference, it should be crossread by a second member of your group, or your supervisor
- The opponent should try to mimick a reviewer

- Text Skeleton reviewing and revision
  - The crossreader should phrase the *thesis question* for every paragraph which is answered in the paragraph
  - If she cannot formulate a thesis question, the paragraph is not coherent → must be rewritten
  - Typically, a discussion about the questions is started afterwards
- Revision of research question, result, method
  - Which form of hypothesis? research question?
  - Which form of research method?
  - Which form of research result?
- Review of evaluation

- Syntactic revision (grammar, spell-checking..)

34.5. Reviewing and Grading

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1) Reviewing
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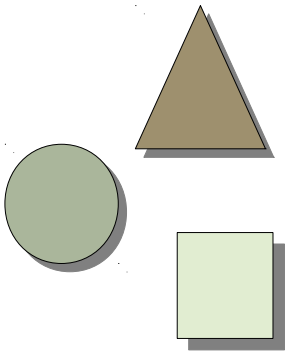
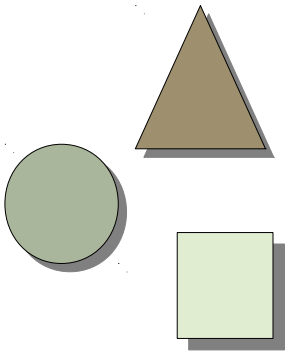


34.5.1 Reviews



Reviewing – What's That?

- A reviewer shall
  - control of quality of the paper
  - be constructive to give hints and tips to the reader to improve the paper
  - control of scientific structure [Shaw]: Are the following clearly defined?
    - Research question, research result, research method, evaluation
  - judge on the innovation depth: how deep is the innovation?
  - judge on acceptance for a conference or journal
- Concision, Conherence, Unity: Find the controlling ideas of the paper

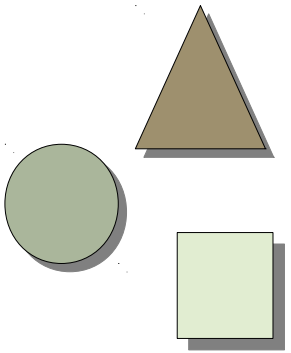
Parts of a Written Review

- Summary:
  - the reviewer shows what he has understood as the main ideas of the paper
- Pros:
  - what speaks for the paper? is it relevant? How deep is its innovation?
- Cons:
  - Major technical flaws
  - Not novel
  - Weaknesses in the comparison to related work, missing related work
  - Weak evaluation
- Hints for improvements (constructive critisizm)
- Grading
  - justification of the grading
- Minor issues:
  - if the paper is accepted – what has still to be corrected? (typos, fonts, ..)
- Comments for the program committee or journal editors

Example Reviews

- Reviewing system “Easychair”
- Master thesis review
- PhD thesis review

34.5.2 Grading



Grading Criteria for Scientific Reports with Scales

Criteria list of [Stickel-Wolf]:

- Presentation:
  - Readability and Comprehensibility (1-10)
    - Quality of the figures
    - Quality of the problem statement and thesis statement
  - Topic formulation (Themenstellung) (1-5)
    - how complex is the topic?
  - Structure: Outline: How good is the structure? (1-5)
- Quality of work in the topic (1-10)
- Degree of independence in research
- Are the Formalia all met?
- Entire impression

Important Criteria with Scales

- Relevance of research (with regard to readers) (1-10)
  - Really relevant for human mankind
  - not really relevant
  - irrelevant
- Fitness to the topic of the conference (1-5)
- Depth of innovation of research result (1-5)
  - deep vs shallow
  - narrow vs broad
- Quality and completeness of Related Work (1-10)
- Reviewer quality – self estimation (traffic light scale)
  - expert (green), aquainted (yellow), low knowledge (red)
  -

Final Judgement of a Paper

- [Davis] Often, a 5-item Lickert Scale, balanced positive and negative, is used:
  - **Accept** in its present form **with no revisions**
  - Accept after **minor revisions** (re-review unnecessary)
  - Accept after **major revisions** (after re-review)
  - Reject but encourage **re-submission** in another form (e.g short paper, poster)
  - **Reject**
- 6-item scale
  - **Excellent** - This paper is amongst the best papers I have ever read (short-list for best paper award)
  - **Very good** paper (Consider short listing for best paper award)
  - **Sound** paper - I recommend acceptance
  - **Borderline** - This paper could be accepted if there is room
  - **Poor** - This paper has limited contribution, or the work is not yet ready for publication. I do not believe it should be accepted, but if other reviewers differ, I would not oppose strongly
  - **Unacceptable** - The work makes no contribution or, worse, it is flawed or scurrilous. I believe that publication of this paper would reflect badly on our community. I would strongly oppose any other outcome.

Champion

- **"Identify the Champion"** for taking an explicit standpoint and forcing of decisions (Oscar Nierstrasz)
  - A: I fill fight for it
  - B: I am in favor, but I will not fight for it
  - C: I am against, but I will not fight against it
  - D: I will fight against it

The End