# 33. Revising and Reviewing a Research Paper

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1) Determine your paper type
2) Determine a structure
3) Roles in writing and revising
4) Revising
5) Help – I got stuck!
6) Reviewing
7) Grading

# 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
- Dale J. Benos, Kevin L. Kirk, and John E. Hall. How to Review a Paper. http://advan.physiology.org/content/27/2/47.full.pdf+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
- [Oxford Style Guide] University of Oxford Style Guide. http://www.ox.ac.uk/public-affairs/style-guide  Writing rules, comma rules, etc.

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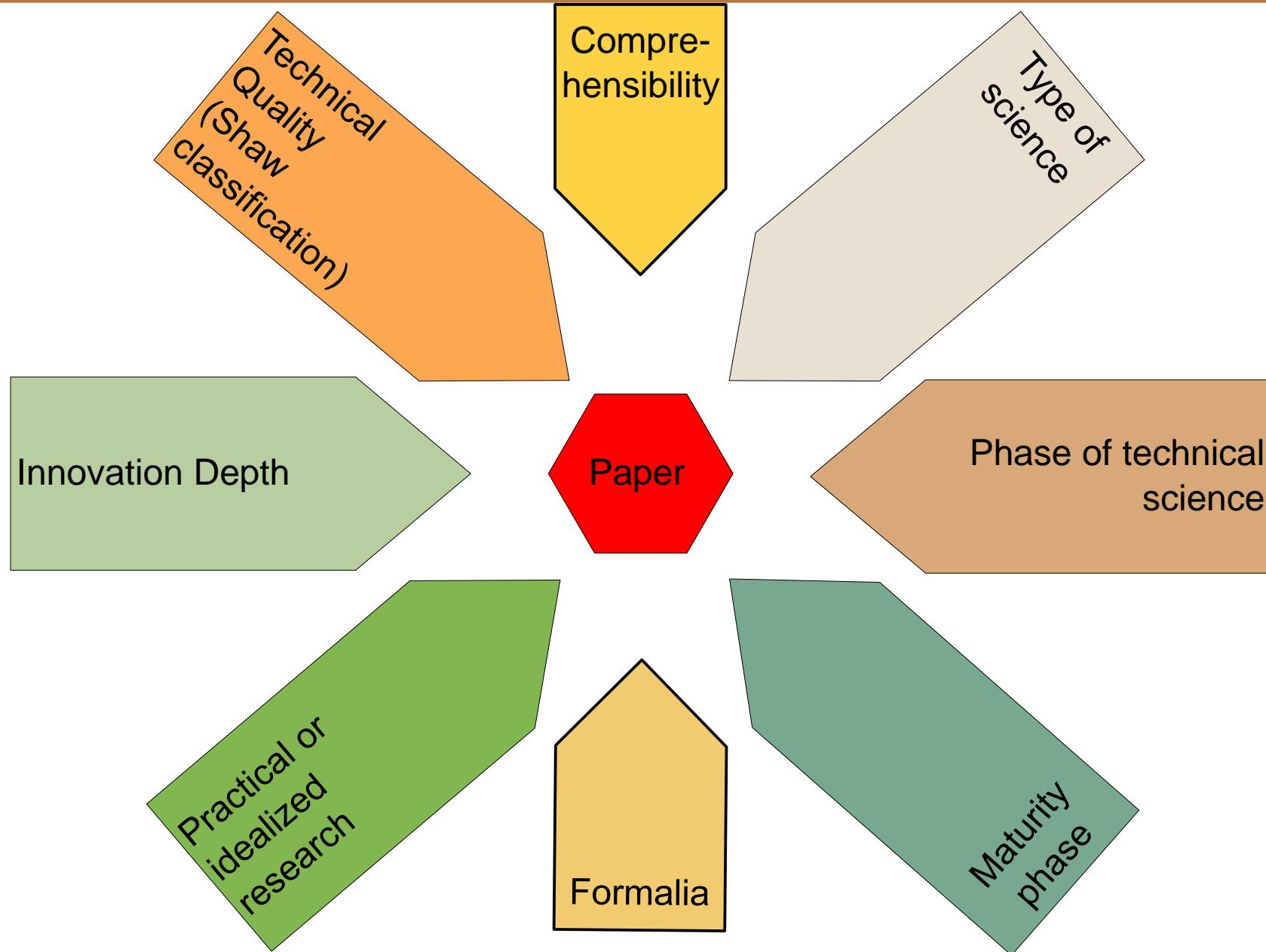
"Informatics is an *engineering science*. Like other branches of both engineering and science it contributes to the advancement of knowledge by formulating hypotheses and evaluating them. It is not enough merely to describe some new technique or system; some claim about it must be first stated and then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

# Facets of Evaluation of a Paper
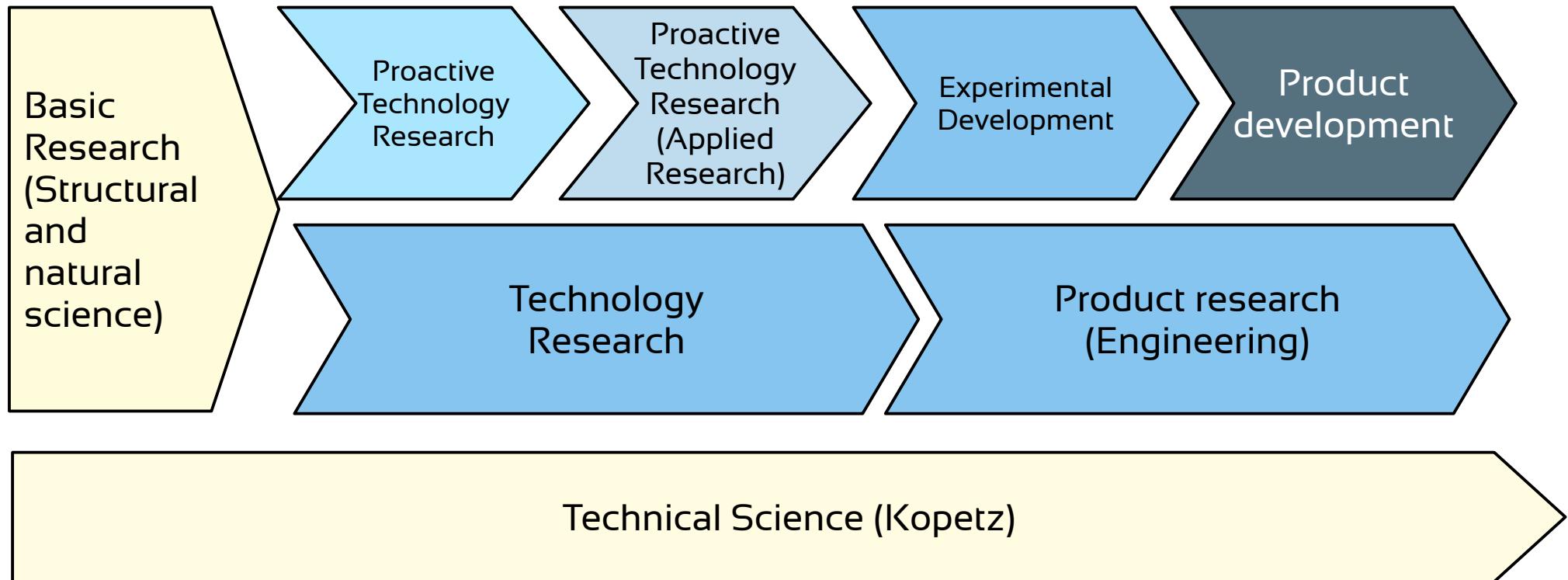
# 33.1 Determine Type of Paper

# Technology Research
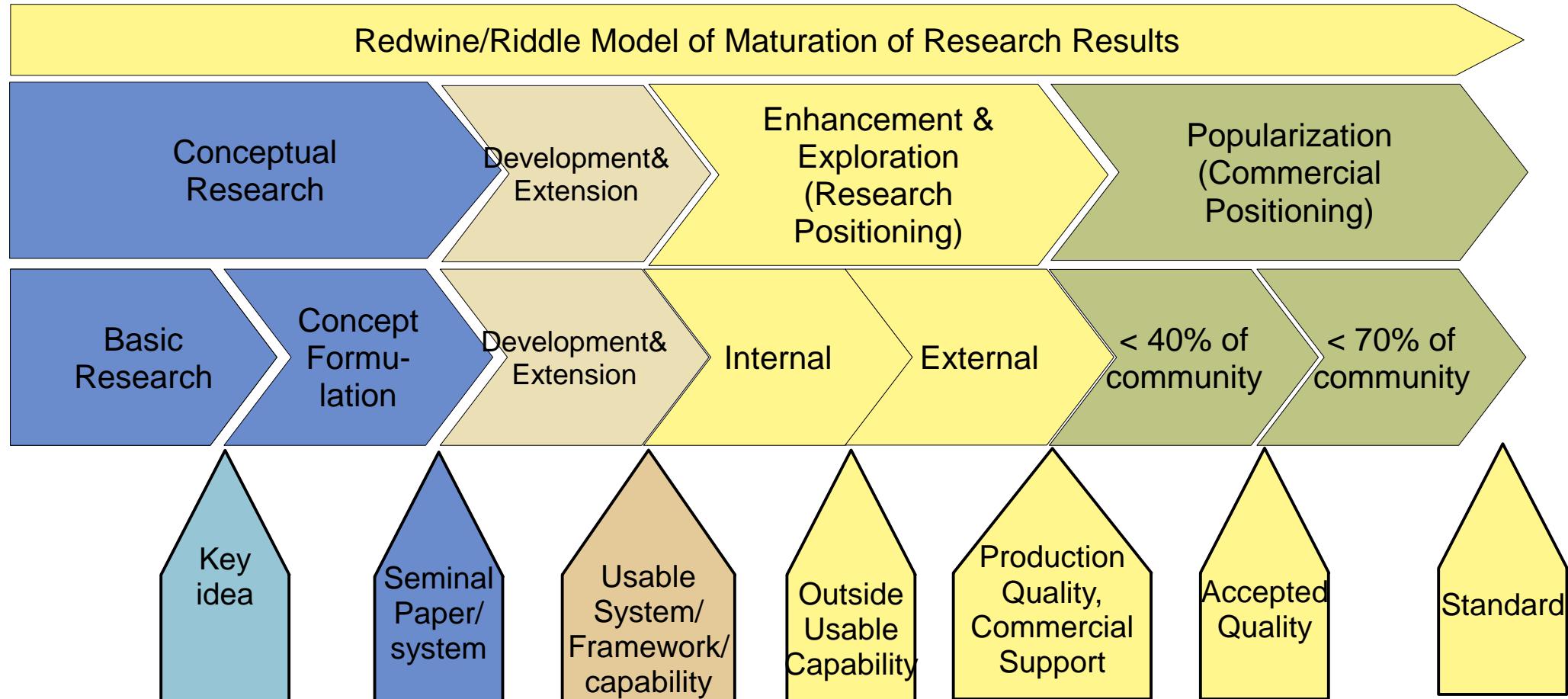
► According to Frascati Manual and Kopetz

► Technology research can be *proactive* or *reactive*

# Redwine-Riddle Model of Technology and Research Maturization ("Maturity Model")

| Redwine/Riddle Model of Maturation of Research Results | | | | |
|---|---|---|---|---|
| Conceptual Research | Development& Extension | Enhancement & Exploration (Research Positioning) | Popularization (Commercial Positioning) | |
| Basic Research / Concept Formu-lation | Development& Extension | Internal / External | < 40% of community | < 70% of community |
| Key idea | Seminal Paper/ system | Usable System/ Framework/ capability | Outside Usable Capability | Production Quality, Commercial Support | Accepted Quality | Standard |

# 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 | | | | | |

# How to Write Several Papers out of one Topic

► Change to Redwine/Riddle model of research maturization

► 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 | | | | | |

# 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
- Which type of research? [Shaw]
    - Practical vs idealized research
    - Transferring an idealized result to a practical problem

# 33.2 Determine a Structure

## with the Shaw Classification of Papers

# Which Paper Pattern (Shaw)?

- Determine research method
- Which type of hypothesis [Bundy, Newman, Shaw]?
    - Many types result from the Shaw classification on Research Questions
    - Determine research question, success criterion, result, valuation, limit
- Type of success criterion
    - automating or optimizing
    - enhancing (olympic, efficiency)
- Type of result
- Type of evaluation
- Limit statement

# Which Structure?

- ► Which type of problem-objective-solution-evaluation (POSE) paper
- ► Newman types (Enhanced model, Enhanced Solution, Radical solution ..)
- ► Other abstract types (MOPARC, 4-quarter,..)
- ► Decomposition of thesis into components (subtheses), becoming controlling ideas of sections
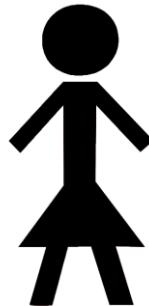
# 33.3 Roles of the Writing and Revision Process
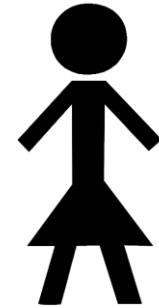
# Roles in Writing
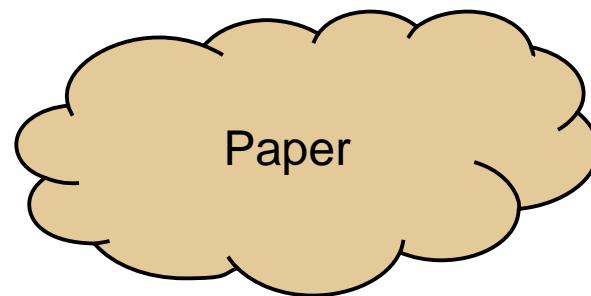
Introduction and conclusion writer

Paper leader
Abstract writer

Section leader

Crossreader
(Proofreader)

Section writer

Paper

Experiments

Research Hypothesis
(Contributions)

Skeletonizer
(creating the section thesis statements and controlling ideas)

# The Skeleton of a Paper

- ▶ [Franklin-Parks]
- ▶ Start with an abstract (by selecting and filling a template)
- ▶ Determine Outline
- ▶ Write Section and Paragraph Questions (thesis questions) first
- ▶ Then write Paragraph Thesis Statements, before writing the text

**Controlling Idea = Topic + Benefit**

- ▪ **Thesis Statement = Topic + Controlling Idea + Controller**
- ▪ 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
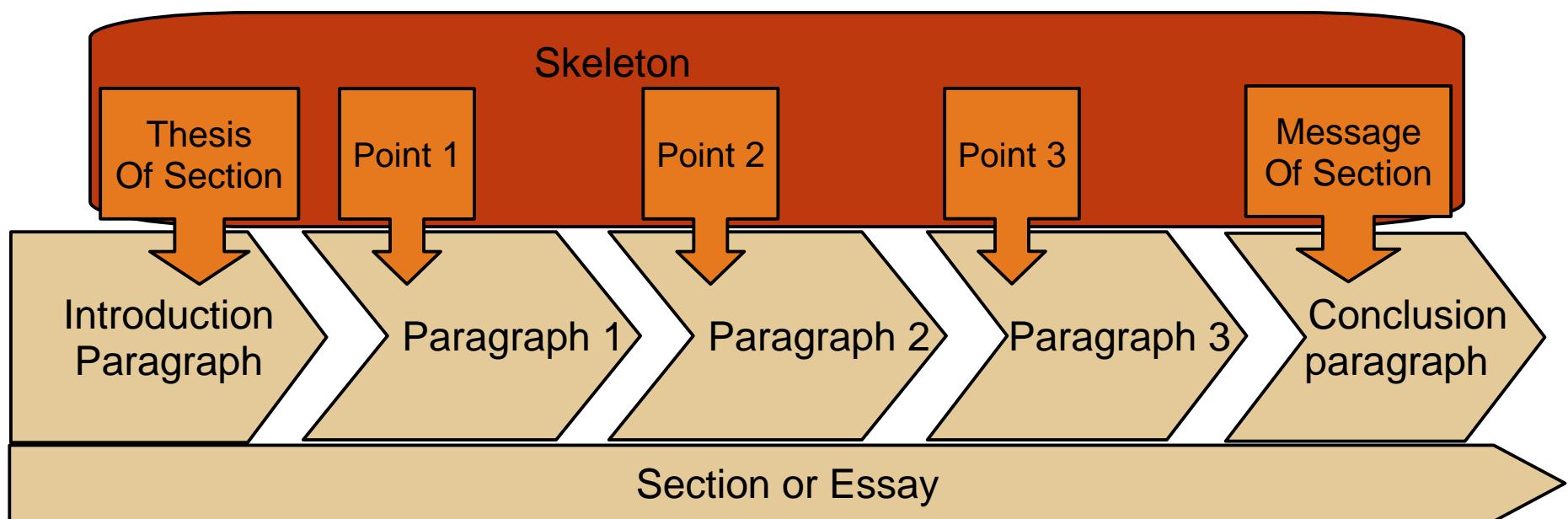
Law of unstability:
As long as you do not have a stable skeleton, the paper text will be unstable

# 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.

Skeleton

| Thesis Of Section | Point 1 | Point 2 | Point 3 | Message Of Section |

| Introduction Paragraph | Paragraph 1 | Paragraph 2 | Paragraph 3 | Conclusion paragraph |

Section or Essay

# 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

- ▶ Read [Oxford Style Guide]
- ▶ 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 definition 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 definition 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.

# Comma Rules in English

- [http://en.wikipedia.org/wiki/Comma](http://en.wikipedia.org/wiki/Comma)
- Oxford comma
- Comma splice
- Run-on sentences

# 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. Help – I Got Stuck!
# Overcome the Block While Writing Papers

# "Help - I do not find an good evaluation method"

- Work on the qualitative "Discussion" to find arguments
  - PMIQ Perspective Canvas
  - VPC Value Proposition Canvas: whose pain is killed? Whose gain is delivered?
  - Sweet-Spot Canvas to hammer out the advantages of your own approach
- Work on "Comparison to Related Work"
  - NABC: work out competitors
  - SweetSpot Canvas: hammer out sweet and sour spots
  - VPC Value Proposition Analysis also for competitors
- Work on the "Problem analysis"
  - Topic Fan: to get more "observations"
  - NABC: to work out benefit-for-cost
  - Problem Reframing Canvas: to find a "better" problem
  - Stakeholder Reframing Canvas
- Work on quantitative analysis
  - With GQM
  - With Kiviat graphs and portfolios
  - With spreadsheets

# 34.5.2 Problem Reframing Canvas/Matrix

► [Creability]

► [ReframingMatrix]

# Problem Reframing Helps if a Problem Does Not Lead to a Successful Solution

- ► Sometimes, no successful evaluation can be found for the solution for a problem
- ► Then, the problem should be *transformed (morphed, reframed)* to find a similar problem for which a successful solution can be found:
    - Reframed to another set of stakeholders (Stakeholder reframing)
    - Reframed to the 4P perspectives (product, planning, potential, persons)
- ► Fill in **Factors**, Questions, Critique, Ideas
- ► Fill in **Success factors**
- ► After filling, redefine problem (reframe problem)

# 34.6. Reviewing and Grading

# 34.6.1 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
    - control the structure of the write-up
        - good skeleton?
        - good visualization
    - judge on the innovation depth: how deep is the innovation?
    - judge on acceptance for a conference or journal
- ► Concision, Coherence, 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 criticism)
- 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

# 34.6.2 Grading

# Grading Criteria for Scientific Reports with Scales

Criteria list of [Stickel-Wolf]:

Paper:

- 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)
- Depth of innovation of research result (1-5)
  - deep vs shallow
  - narrow vs broad
- Entire impression

# Important Criteria with Scales

Relation of the paper to the rest of the world:

- ▶ Degree of independence in research
- ▶ Quality and completeness of Related Work (1-10)
- ▶ Relevance of research (with regard to readers) (1-10)
    - Really relevant for human mankind
    - not really relevant
    - irrelevant

Are the Formalia all met?

- ▶ Page length
- ▶ Form of bibliography
- ▶ Fitness to the topic of the conference  (1-5)

Reviewer

- ▶ Reviewer quality – self estimation (traffic light scale)
    - expert (green), acquainted (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

# 34.7 Biasedness (Befangenheit)

# Biasedness of Reviewers

- ▶ A potential reviewer is biased, if [DFG-Vordruck 10.201 – 4/10]
  - collaboration with the author, even planned
  - economic interests
  - PhD or Master supervision (until 6 years after the end)
  - family relation of first degree
  - belonging to the same employer
- ▶ Potentially biased:
  - family relation of secondary degree
  - common publication with the last 3 years
  - part of a competing project proposal or paper
  - counter wise reviewer in the last 12 months

# The End

- ▶ Which roles exist for paper writing?
- ▶ What is "skeleton revision"?
- ▶ Explain some criteria for classifying and reviewing a paper.
- ▶ Why is "Identify the champion" good?