

Research writing and Oral Presentation

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Outline

- Technical /Research writing
- Writing steps and rules for each step
 - Preparing and organizing
 - Composing
 - Revision
- Examples of writing
 - Thesis
 - Proposal

Technical writing(TW)

- Writing: presentation using text
- Writing vs oral presentation
 - Rom vs ram
 - Time
 - Face-to-face
- Writing ≠ “writing sentences”
 - Technical writing = to write research report
- Technical writing to structure information using both text and design to achieve an intended purpose for a clearly defined audience(Handbook of T.W., 7th ed.)

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Technical writing: research reports

- Goals:
 - to tell others what you found and how you found it (i.e. a record of the research process, not just a summary of findings)
 - to give others the benefit of your experience (also negative experience!)
 - to give an indication of where researchers might go next.
- Types of reports:
 - books
 - full-length papers(focus on this)
 - conference papers, short communiques, letters to editor etc.
 - in house reports
 - manuals

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Technical writing

- Research reports
 - Should be succinct and formal (i.e. say a lot in a few words)
 - Be professional and serious
 - Aim at objective, accuracy, and clearness
- Two properties of TW
 - Natural language
 - Mathematical languages

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Elements of good TW

- Thoughtfulness
 - result on second thoughts
 - persuasive and economical in both words and structure
- Correctness
 - grammar, punctuation, spelling, and proper syntax
- Appropriateness
 - must have the right tone and avoid verbosity
- Readability
 - text flows smoothly, reader can tell where a paragraph is heading, summaries can be used to assist reader to digest a chapter.

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Writing steps

Similar to that of oral presentation

- Preparing
- Organizing
- Composing
- Revising

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Preparing and organizing

- Access reader
- Writing goal
- Keep main points in mind
- Organizing: making an outline

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Outline

make story line: logically efficient order

1. Select points
2. Writing Outline
 - **Message 1**
 - Support 1-1 for MSG 1
 - Support 1-2 for MSG 1
 - Sub-support 1-2-1
 - Sub-support 1-2-2
 - **Message 2**
 - ...
 - ...
 - ...
 - ...
 - **Message n**

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Organizing the contents

- Making basic units
- Organizing the units
 - Tell them structure
 - Arguments should be placed close to where they are used
 - Logical and efficient order
- Write outline

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Composing-I

- Composing
 - Getting ideas onto paper
 - Paragraphs, sentences(next lecture)
- Notation
 - Consistent and suggestive
 - Avoid unnecessary notation
- Sentence
 - Consistent and simple structure
 - Clearness
- Examples and counter examples

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Composing-II

- How to cite
 - In text: [3], Maier 1993, MaNu97a, ...
 - In reference list: different types of pubs; give complete information (incl. pages, year, publisher, no abbreviations, ...)
- Formulas
 - Should be treated as regular text (punctuation)
 - Equation number
- Figures/Tables
 - Better than a thousand words
 - Always use meaningful captions
 - Explain figure
 - Denote the meaning of the axes

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Revising

- Read the draft after some time since the first writing
- Read the draft as if it is written by others
- Proofread
 - Read for cohesion, logic, and comprehension
 - Whether it reflects your intention
 - Check citations
- Read with one rule at a time(grammar, flow, ...)
- Get someone to read for you
- Plan on rewriting 3 or 4 times

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General structure of the report- I

- • Title page
- include a meaningful title, your name, affiliation
- • Abstract or executive summary
- • Introduction
 - Problem statement(pinpoint the problem)
 - Significance of the information goal and this study
 - Relation to other issues
 - Purpose of the study relative to problem
 - Sources in bibliographic citation
 - Critique, review, and summary of related research (synthesize)

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General structure of the report-II: main part

- Partition into sections and subsections
- Results and Implications
 - Assumptions and definitions
 - Theorems, simulations, experiments, ...
 - Interpretations of your results
 - Limitations on your results
- Method - State and describe your research methods.
- Discussion and/or Recommendations (may be part of results & implications)
 - Generalization and abstraction from your results
 - Recommendations for applying the results and findings

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General structure of the report- III

- Conclusions
 - Summary of report
 - Suggestions for the next step
- (Acknowledgements)
- References
- (Info about authors)

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Thesis writing

- Very similar to report writing
- However, one additional implicit goal:
- You want to prove that you are able to perform good research
- Thesis may be longer than research report
 - Semester and diploma thesis: not more than 40 pages
 - Dissertation: not more than 150 pages
- Thesis should have more tutorial value than report
- Starting point for next student
- Self-sufficient manner

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Research Proposal writing-I

- Something about “will do”
- (paper: something about “done”)
- Specific and few readers
- Particular objective(to receive reader’s interests)
 - Business need
 - Practical value
 - Theoretical progress

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Proposal writing-II

- Describe your ideas, motivation, and advantages
- (Pay more attention to this than other writing)
- Advertising yourself
 - show that
 - You(your group) are expert
 - You(your group) already achieved something related
 - You(your group) has appropriate resources (man & equipment, etc.)
- One page proposal
 - Generally, managers are very busy
 - Simple and compact proposal or progress report

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Comments

- Bad thinking never produce good writing(Lamport)
- Good writing promotes good thinking
- Writing makes an exact man(Bacon)
- References
 - The elements of style, 4th Ed., W. Strunk and E.B. White, Allyn and Bacon.
 - Writing smart, 2nd Ed., Marcia Lerner, The princeton review
 - Handbook of technical writing, 7th Ed., G.J. Alred et. Al., St. Martin's press
 - The one page proposal, P. G. Riley, HarperCollins
 - Ten simple rules for mathematical writing, Dimitri Bertsekas, M.I.T.

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Oral Presentation

Outline

- Presentation
- Plan your presentation
- Prepare presentation
- Presentation delivery

Presentation is

- To convey information to others via
 - speaking: oral presentation
 - writing: article

for the purpose of

- getting grade(in this course)
- graduating
- persuading others
- communicating with others

Importance of presentation

- Presentation is a part of research by definition
- The higher your position is, the more presentation has

Speaker vs audience

- Speaker(or writer)
- Audience(or reader)
- Want to convey
- May want to hear
- One person
- Many person
- Familiar with the topic
- May not be familiar
- ...

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The four steps

- Plan your presentation
- Prepare your presentation
(visual aids, what to say, ...)
- Rehearse
- Presentation delivery

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Plan your presentation-I

- Determine the type of talk (objective)
 - Overview talk
 - Tutorial talk
 - Talk to present new research results
 - Presentation for selling a product

- Assess knowledge level of audience
 - Homogeneity of audience
 - Knowledge of audience
 - Tailor talk to the audience

- Major points you want to present
 - 3-5 points

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Plan your Presentation-II

- **Your message**
 1. Why was the work done?
(State problem and goal)
 2. What are possible solutions?
(State solutions)
 3. What findings resulted from the work?
(Present the results of your work)
 4. What do the results imply?
(State consequences of your work)

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Plan your Presentation-III Tell'em structure

Them = Audience

1. Tell'em what you're gonna tell'em
 Overview, introduction, motivation **20%**
2. Tell'em
 Main body of talk **70%**
3. Tell's what you told'em
 Summary **10%**

Don't forget:

- Few main points
- Design your presentation around time
- Don't collect facts – tell a story

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Plan your Presentation-IV The elements of a talk

- | | |
|--------------------------|--------|
| - Title | Cover |
| - Authors/Affiliations | |
|
 | |
| - Problem statement | Intro |
| - Research question | |
| - Literature review | |
|
 | |
| -Research method | Main |
| - Research design | |
| - Key assumptions | |
| - Results | |
|
 | |
| - Limitations of results | Ending |
| - Implications | |
| - Future work | |

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Prepare your presentation-I visual aids: computer-based

- VAs enhance understanding of topic
- VAs guide you through your presentation
- Computer/LCD
 - Check how to operate before talk
 - How/where page up/down
- Overhead
 - Prohibit hand writing
 - Landscape
- Handout
 - For failure of Vas
 - To stay at a particular slide

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Prepare your Presentation Visual Aids-II

- The “minimum 10s and maximum 100s per slide” rule
- The “2 minutes per slide” rule (The rule for technical presentations)
- KISS: **Keep It Simple Stupid**
(read or see the slide?)
- Visibility:
Font 18 Font 20 Font 24 Font 28 Font 32
- Limit the fonts: at most 2 different fonts
- Watch your colors(at most 3 colors) Use short text; pictures and graphs are nice
- Don't overdo formulas
- One slide ~ one message

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Prepare your Presentation Visual Aids-II

- Check regularly whether you focus on the main points
- Check regularly for logic and structure
- Keep the allotted time in mind
- Software
 - Slide: Powerpoint, seminar package, beamer
 - Tools for graphics: ...
- Tips
 - How to check the organization
 - GPS

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Rehearse your Talk

- Always do !!
- Rehearse for yourself
- Rehearse with audience
- Take rehearsals serious
- Rehearse early enough to make modifications

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Presentation Delivery-I

- Plan ahead (know the room; tech. equipment; ...)
- Know the introduction by heart
- Concentrate before your talk
Recall your main points
- Speak freely (both: don't read and don't recite)
- Don't use notes (the most cheat cards)
- Use humor (but needs to be clean, appropriate and should make a point)
- Dress right

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Presentation Delivery-II

- Attitude/Style
 - Keep good time
 - Be enthusiastic
 - Be dramatic
- Voice
 - Speak loudly and clearly
 - Avoid monotony (change volume, speed, rhythm; make pauses)
- Mannerism
 - Look at your audience
 - Keep eye contact
 - Move, but don't pace
 - Use gesture and body language

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Presentation Delivery-III

- Interact with audience
 - Questions to audience(not frequently)
 - Be open to questions
- Ending a point and beginning a new point
 - Slow down and higher volume
 - Short pauses
 - Appropriate expressions
- Dealing with nervousness
 - deep breathe, slow down, and confess it
- Language(English)
 - Keep it simple
 - Emphasize the key points
 - Check the difficult pronunciation