

Writing Technical Articles in English

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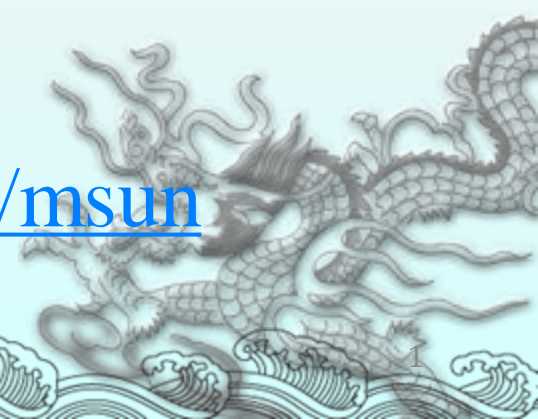
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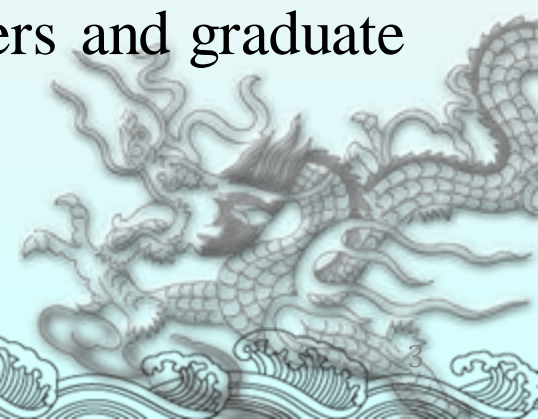


Purposes of Technical Writing

- ◆ Communicate your work to the world.
 - ◆ If people don't know about your work, they won't use it.
 - ◆ Others may use your results but do not need to explore what you have done.
- ◆ Research enhances the visibility of a university but teaching does not.
- ◆ Research is communicated to others through publications.
- ◆ Part or all of the job of a university faculty member is research.
- ◆ Research is a process of creating knowledge and teaching is a process of passing knowledge from teachers to students.

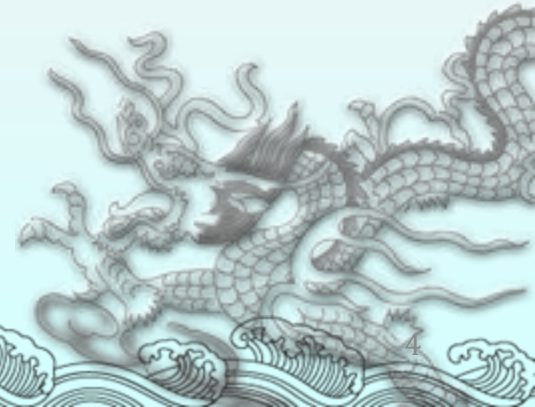
Why English?

- ◆ Articles in English have a wide exposure to all potential readers.
 - ◆ Most of the established journals are in English. These journals have their established channels for distribution.
 - ◆ People with different native languages can read English articles.
- ◆ Articles in English enhance the visibility of not only the authors but also the institution that they work for.
 - ◆ Many universities require their faculty members and graduate students to publish in English.
 - ◆ Publishing is part of the job of faculty members and graduate students.



Requirements for Technical Writing

- ◆ Quality research is the raw material of technical writing. Good writing is supported by good research.
- ◆ Clear writing is necessary but contribution is more important. A good paper cannot be written without substantial contribution.
- ◆ Aim for substantive contributions when doing research, not just small pieces.
- ◆ If you have quality research, you will always find an outlet for your work.



Requirements for Technical Writing

(continued)

- ◆ The topic must be new. Your work cannot be a repetition of the work published by somebody else.
- ◆ There is no difference between writing in Chinese, in Indonesian and in English. Language is only a medium carrying your information. If you can write well in Chinese or in Indonesian, you can certainly write well in English.
- ◆ Clear writing reflects clear thinking. Your ideas must be clearly organized and presented.
- ◆ Write what you want to say but do not simply recite what others have said.

Goals for Your Paper

- ◆ Communicate ideas, new models, new solution approaches, new applications, etc.
- ◆ Persuade other people that your approach is better than other approaches.
 - ◆ Your model may more closely represent the real world problem.
 - ◆ Your solution approach may find better solutions or can find similar solutions by using less computation time or less computer memory space for an existing problem.
 - ◆ Your application may have positive financial, economic, or environmental effects.
- ◆ Describe experiments and results clearly to allow others to reproduce your results precisely.
- ◆ Have a target journal for your article when writing.

Know Your Audience

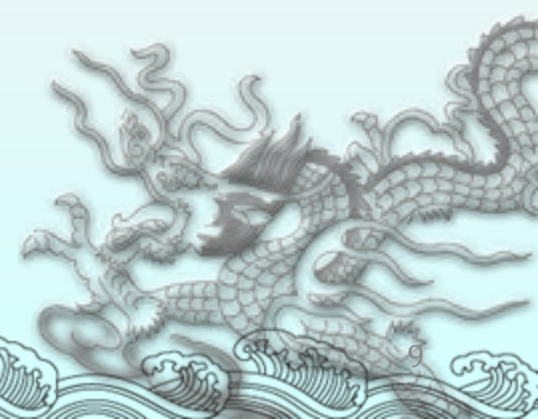
- ◆ Experts in your area. They know the area well.
 - ◆ Do not need to provide a lot background material.
 - ◆ Do not write the paper as a tutorial.
 - ◆ Do not write the paper as a textbook chapter.
- ◆ People outside your area. They do not know much but are interested in your work.
 - ◆ Give sufficient details about what you did in your study.
 - ◆ Do not describe background materials in detail. Rely on references and point out where the readers can find the background material.

Know Your Audience (continued)

- ◆ Industry practitioners. They may or may not know your area but want to use your results.
 - ◆ The details of your contribution should be sufficient for them to reproduce what you did.
 - ◆ For complicated models and algorithms, provide one or more examples. Sometimes rely on examples too.
- ◆ Casual readers. They may just want to know what was done but do not need the details.
 - ◆ They may read the Abstract, part of the Introduction and/or the Conclusions to learn what was done possibly merely for the purpose of citing your paper.
 - ◆ Have the Abstract, Introduction and Conclusions well written (more about these parts latter).

The First Draft

- ◆ The first draft of a technical paper does not need to be perfect. Editing or rewriting is an integral part of technical writing.
- ◆ The beautiful part of writing is that you don't have to get it right the first time, unlike, say, a hair cut.
- ◆ Start writing immediately when you start the research project.
- ◆ Take notes in the process or stages of the study, such as literature review, coding, data collection, and computational experiments.
- ◆ Write down whatever related to the topic in the studying process. Duplications are alright.



Editing

- ◆ Most of the effort in technical writing is editing. In research, most of the time is doing, *e.g.*, conceptualization, literature review, survey or data collection, coding, computation, statistical analysis, etc., and only a small part of time is writing.
- ◆ Reorganize the sections, paragraphs and sentences
 - ◆ Put sentences addressing the same issue in the same paragraph and separate the paragraphs conveying different information.
 - ◆ Delete duplicating paragraphs or sentences.

Editing (continued)

◆ Fine editing

- ◆ Delete unnecessary words.
- ◆ Break down complex sentences.
- ◆ Rewrite sentences for clarity and smooth flow.
- ◆ Convert passive into active voice.
- ◆ Convert first person to third person.

◆ Proofreading

- ◆ Proofreading is an art and a craft.
- ◆ Put the manuscript aside for several days and read it again after finishing the final draft until you cannot find ways to improve it.



Rules for Technical Writing

- ◆ Be honest
 - ◆ Do not over claim your contributions.
 - ◆ Support your claimed contributions with evidences such as proofs, experimental results and comparisons with other existing approaches.
 - ◆ Allow others to reproduce your results.
- ◆ Avoid pilferage
 - ◆ Copying one paper is pilferage but copying many papers is a literature review.
 - ◆ Survey papers usually summarize and categorize the publications in a specific field within a time period.
 - ◆ When use the content of others, always cite the original publications.
 - ◆ When quote something word-by-word in its original form, put the quotation in quotation marks.

Rules for Technical Writing (continued)

◆ Avoid Research Misconduct

- ◆ In December 2000, the U.S. Office of Science and Technology Policy (OSTP) proposed a research misconduct policy, which was subsequently adopted by ten federal agencies.
- ◆ According to OSTP, “Research misconduct is defined as fabrication, falsification, or plagiarism, collectively referred to as FFP, in proposing, performing, or reviewing research, or in reporting research results.”
- ◆ OSTP states that “The research record is the record of data or results that embody the facts resulting from scientific inquiry, and includes, but is not limited to, research proposals, laboratory records, both physical and electronic, progress reports, abstracts, theses, oral presentations, internal reports, and journal articles.”

Rules for Technical Writing (continued)

- ◆ Be nice when talking about shortcomings or limitations of other works
 - ◆ Your work may have mistakes, errors, shortcomings or limitations too. If you are mean to others, others will be mean to you too.
 - ◆ Other authors that you criticize may be your colleagues, your Ph.D. advisor, or your friends.
 - ◆ The authors that you criticize the most will be, very likely, your reviewers.
- ◆ Be reader friendly
 - ◆ Do not treat them as idiots.
 - ◆ Do not use too long sentences.
 - ◆ Read a friendly written paper is a joy but reading a rudely written paper is agony.

The Title

- ◆ The title should represent the research underlying the article.
 - ◆ All search engines use the title to search for articles.
 - ◆ Just by looking at the title, a potential reader may decide whether to get a copy of the article.
- ◆ Make the title as short as possible.
 - ◆ Do not use a whole sentence if possible.
 - ◆ Do not use extra words such as “A Research on” or “A Study in”.

The Abstract

- ◆ Summarize the paper in one paragraph.
- ◆ State the problem, your method, the major results, as well as the main contributions. Many readers read abstracts and then decide whether to bother with the rest of the paper.
- ◆ Make sure that terms identifying your work are found in the abstract so that search engines can find your article. In particular, the name of general research area, *e.g.*, “supply chain management”, “data minding” or “big data analytics”, is included.
- ◆ Similarly, terms not in the paper should not be used in the Abstract.

The Abstract (continued)

- ❖ Avoid general motivation in the abstract, avoid equations and mathematics, avoid the use of acronyms, and avoid the use of references.
- ❖ The material in the abstract should not be repeated later word for word in the paper, *e.g.*, in the Introduction or Conclusions.
- ❖ Rest of the paper should stand alone without the abstract. Repeating the Abstract in the Introduction or Conclusions is acceptable, but not word-by-word.
- ❖ The abstract is written at last after the whole paper has been written.

The Introduction

- ◆ The purpose of the Introduction is to tell the readers what your paper is about and encourage them to read your paper.
- ◆ Readers should learn precisely from the Introduction why the paper is worth reading.
- ◆ The Introduction is crucially important.
 - ◆ By reading the Introduction, a referee will probably make his or her mind about whether to accept or reject the paper. The rest of the paper will be used to look for evidence to support his or her decision.
 - ◆ A reader will continue on if the Introduction enthralled him/her, and will put the paper aside otherwise.

The Introduction (continued)

- ◆ The following should be included in the Introduction
 - ◆ Background: What the problem is.
 - ◆ Motivation: Why the problem is interesting and important. Why it deserves the research efforts.
 - ◆ Overview of the paper: Why the problem is difficult to solve. Why other researchers did not work on it.
 - ◆ Contributions of the study: What you did in the study. What the main features of the new model are. What the key components of the new solution approach are. What the computational results look like. If the new approach has any limitations.
 - ◆ Summary: List the sections and a brief description of each section so that readers can easily locate the parts that they want to read.

Previous and Related Work

- ◆ This part can be written into the Introduction if not too long or can stand as its own section otherwise.
- ◆ Show your familiarity of the field.
- ◆ Highlight the major contributions of each work that you cite.
- ◆ Acknowledge upon what your work is based. You are seeing further because you are standing on the shoulders of the giants.
- ◆ Explain precisely how your work is different from those cited in the references.
- ◆ Cite a few recent publications. Keep up the literature.
- ◆ Cite at least one paper published in the journal to which your paper will be submitted.
- ◆ Delineate material that is not original but is needed for the paper.

The Major Sections

- ◆ How many sections to have depends on the content of the article.
- ◆ The article should be balanced, *i.e.*, the sections should have approximately the same length.
- ◆ Have enough details for the readers to follow but not too much detail to bore the readers.
- ◆ Break a long section into two or combine two short sections into one.
- ◆ For a methodology paper, the following sections may be included.



The Model

- ◆ Introduce the notations and state the mathematical model.
- ◆ Each notation should be introduced before being used or immediately after the model is presented.
- ◆ Clearly explain each mathematical expression, equation, or inequality.
- ◆ Discuss the difficulty or complexity of the model, such as the number of constraints and the number of variables, especially the number of integer variables.
- ◆ If it is a newly formulated model, state its differences from other existing models.

The Solution Method

- ◆ Introduce additional notations used in the algorithm or procedure.
- ◆ Describe the major steps and/or functions. Use subsections for easy reading.
- ◆ Give enough details for the readers to implement your algorithm/procedure.
- ◆ Present a step-by-step summary.
- ◆ If your major contribution is a special procedure or algorithm, you may devote a full section to describe your newly developed procedure and use another section to describe the whole solution method.

Examples

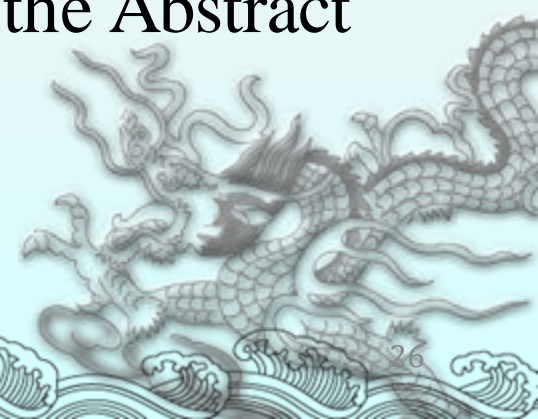
- ❖ Oftentimes, reviewers comment that the example helps a lot.
- ❖ An example may be provided to demonstrate the formulation of the model and/or to show the steps of the algorithm or procedure.
- ❖ The example should be detailed enough to show all aspects of the model or all steps of the algorithm or procedure.
- ❖ Do not write the example as a tutorial. Show the details but do not give a step-by-step count.

Computational Experiments

- ◆ The datasets should be large enough to be realistic.
- ◆ For each dataset, specify the source.
- ◆ If possible, compare the results with those of the most recently published methods.
- ◆ Performance measures
 - ◆ For heuristic method, report both solution quality and running time. For algorithms, pure running time is sufficient.
 - ◆ Sensitivity to important parameters in the algorithm or procedure.
 - ◆ Scalability in various aspects: data size, problem complexity.
- ◆ The results must be reproducible.
- ◆ Use tables and/or figures when convenient.

Conclusions

- ◆ Summarize the major contributions of the study.
- ◆ Point out the limitations, if any.
- ◆ State the directions for future research. Say it clearly if you are actively doing some follow up work. Such a statement marks your niche.
- ◆ Repeating some important results from the Abstract and Introduction is alright.
- ◆ Do not just simply copy and paste from the Abstract or Introduction.



References

- ❖ List all relevant publications to honor the work of others. Acknowledge that your contribution is based on the work of many other researchers.
- ❖ Be generous in citing other works, but stick to the critical references.
- ❖ Correctly spell the names of all authors, including their initials. Specifically do not mix their first and last names.
- ❖ Do not forget that the editor will look for reviewers among the authors of your major references.
- ❖ Cite at least one paper published in the journal to which your article will be submitted.

References (continued)

- ◆ Follow the guidelines of the journal to which your article will be submitted.
- ◆ Edit each item that you copy from the Internet or other electronic forms to make sure that references are consistent in format.
- ◆ Never use *et al.* to omit author names in the references although you can use it in the citations. Authors subsumed into *et al.* may happen to be your reviewers.
- ◆ Leave a space between first name and middle initial, and between middle initial and last name of any author.
- ◆ Use a recently published paper in the journal as a reference for styles.

Some Advices about Word Processing

- ◆ Use only two levels of headings. Use a third level only if absolutely necessary.
- ◆ Define each acronym before using it and define it only once.
- ◆ Leave one space after a comma and leave one or two spaces after a period, consistent throughout the whole paper.
- ◆ Use Styles in Word. There are webpages describing Styles in Microsoft Word, such as <https://support.office.com/en-us/article/Style-basics-in-Word-d382f84d-5c38-4444-98a5-9cbb6ede1ba4?CorrelationId=fb338a58-5226-41d7-992d-9497c77963a6&ui=en-US&rs=en-US&ad=US>.
- ◆ Communicate as clearly as possible in your writing—keep the exposition simple.

Some Advices about Word Processing (continued)

- ◆ Make sure that your figures or images convey information critical to move your argument forward.
- ◆ Pay closer attention to words and sentences highlighted by the spelling checker for misspelled words or sentences with grammar errors. Always run a spelling check on your final paper, no exceptions.
- ◆ When citing references, always use the Authors (Year) style in the writing stage. Convert to [number] after the manuscript is finalized.
- ◆ When copying from other sources, paste plain text only.

Submission

- ◆ Do not submit your paper unless you are fully ready for it.
- ◆ Present your work at a professional meeting or at a departmental seminar to see if you get good feedback.
- ◆ Go over the manuscript and make necessary changes. If you do not have any change to make or if your changes are only a matter of taste, you are probably ready to submit your paper.
- ◆ Write a brief cover letter. You do not need to write much in the cover letter. Do not forget that the editors do not have time to read a long letter.
- ◆ No work is flawless; no manuscript is perfect. Holding yourself to a standard of perfection will ensure that your work is never ready for submission.

Some Common Shortcomings to Avoid

- ◆ The manuscript does not fit the content or style of the journal to which the article is submitted.
- ◆ There are logical flaws or rhetorical leaps in the text.
- ◆ There are missing figures and/or tables, or figures and/or tables not cited.
- ◆ Sections or subsections not numbered in order.
- ◆ Incorrectly cited references such as misspelled author names, first name and last name reversed.

Rejections

- ◆ Paper rejection is often to researchers.
- ◆ It is the manuscript, not you and not necessarily your work, that is rejected.
- ◆ Rejection can be for any reasons, not necessarily because your work or your writing does not meet the standard of the journal. The reviewer may simply not understand your work or the reviewer may simply not want your article to be published.
- ◆ Read the reviewers comments carefully. If the comments are reasonable, incorporate them into your manuscript before submitting it to another journal.
- ◆ Your manuscript may be sent to the same reviewers.

Revision

- ❖ Read reviewers' comments with an open mind. Take a few days or weeks, if necessary, to cool down before starting your revision.
- ❖ Take reviewers' and editor's comments seriously, but it is not necessary to make every change requested by the reviewers or the editor.
- ❖ Nobody else knows more than you do about your study and your paper. Hence, judge which comment is reasonable and which is not.
- ❖ For those reasonable comments, try your best to satisfy the reviewers.

Revision (continued)

- ❖ For those not so reasonable, explain politely why you did not follow exactly what the reviewers requested.
- ❖ Deal with special care for those issues raised by two or more reviewers.
- ❖ In the responses to the reviewers, explain exactly what you have done and what you did not do for each comment.
- ❖ Do not forget to appreciate the reviewers' efforts. They are volunteers donating their time and efforts to review your manuscript.
- ❖ When sending the manuscript back, write a cover letter to the editor explaining the major changes, requested or not, that you made.

Don't Forget

- ◆ You can find an outlet for your work if you did quality research.
- ◆ Writing a technical article in English is the same as in Chinese or in Indonesian. Language is only a medium carrying your information. If you can publish in Chinese or in Indonesian, you can also publish in English.
- ◆ The first draft of an article does not need to be perfect.
- ◆ You can start writing in English immediately.

Thank You!!

