

Technical Writing and Presentation (the art and science of knowledge engineering)

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“The fundamental purpose of scientific discourse is not the mere presentation of information and thought but rather its actual communication. It does not matter how pleased an author might be to have converted all the right data into sentences and paragraphs; it matters only whether a large majority of the reading audience accurately perceives what the author had in mind.”

George Gopen and Judith Swan *The Science of Scientific Writing*

What, Why, How?

Acquiring technical writing skills means the need to accurately communicate thoughts, ideas, information, and messages in writing; and create documents such as letters, directions, specifications, manuals, reports, presentations, graphs, flow charts, etc.

- **Challenges**

- What technical writing in schools prepare students for?
- Why technical writing is a good reflection for learners?
- How does technical writing compare to academic writing?

Academic and Technical Writing

Academic Writing	Technical Writing
Descriptive	Job Description, Observation Report, Incident Report, CV, Process Description, Book Review, Email Message, Webpage, Memo, Agenda, Letter of Recommendation, Survey, Training Manual, Meeting Minutes, Newsletter, Marketing Plan, Poster, Brochure, Catalog.
Narrative	Observation and/or Progress Report.
Analysis	Performance Evaluation, Questionnaire, Cost Analysis, Critique, Feasibility Study Report, Business Plan.
Cause and Effect	Analytical, Product, Field Test Report.
Comparison	Product Comparison, Feasibility Report.
Persuasive	Proposal, Action Plan.

What is Technical Writing?

- It is the type of everyday writing that surrounds us at home, workplace, and community.
- Examples of technical writing may include:
 - White papers
 - Journal Articles
 - Training Materials
 - Instruction manuals
 - Policy and procedure manuals
 - Process manuals
 - User manuals
 - Reports of analysis and design
 - Instructions for assembling and using a product

Technical Writing for Engineers

- An engineer's view is necessarily product-centric. Here are few questions that helps in technical writing:
 - How has this feature been implemented?
 - How does the user interact with this feature?
 - What information does the user need before they using this feature?
 - What information does the user have after they using the feature?
 - **Software:** Does this feature involve any changes to the product user interface (UI)?
 - **Software:** Does this feature involve any changes to the product application program interface (API)?

What Makes Technical Writing Different?

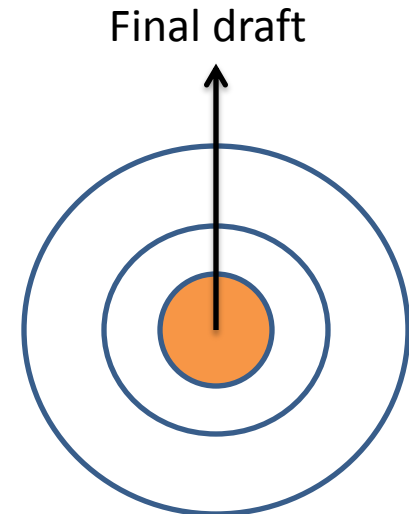
- The information should be prepared, presented and communicated in a certain format.
- The writing should be brief, clear and accurate.
- The writing task should take into consideration the audience's needs, biases, and prior understanding.
- The writing task should present information to help readers solve a problem or acquire a better understanding of an issue.
- The writing should convey technical, or particular information in a simple way that is easy for a non-technical readers to understand.

What Skills Students Need to Master Success and Reflects Verbal and/or in Writing?

- **Basic:** Read; write; listen, speak, calculate.
- **Thinking:** Think creatively; make decisions; solve problems; visualize, reason.
- **Personal Quality:** Exhibit responsibility, self-esteem, sociability, self-management, integrity, and honesty.

Technical Writing Practices

- **Planning:** Understand the task before you Begin
- **Clarity:** Define the unfamiliar
- **Shortness:** Use words efficiently and avoid redundancy
- **Simplicity:** Use details wisely
- **Word Choice:** Avoid complexity
- **Diction:** Correct language
- **Organization:** Arrangement of parts
- **Visual:** Design and graphics
- **Commitment:** Process and Habit

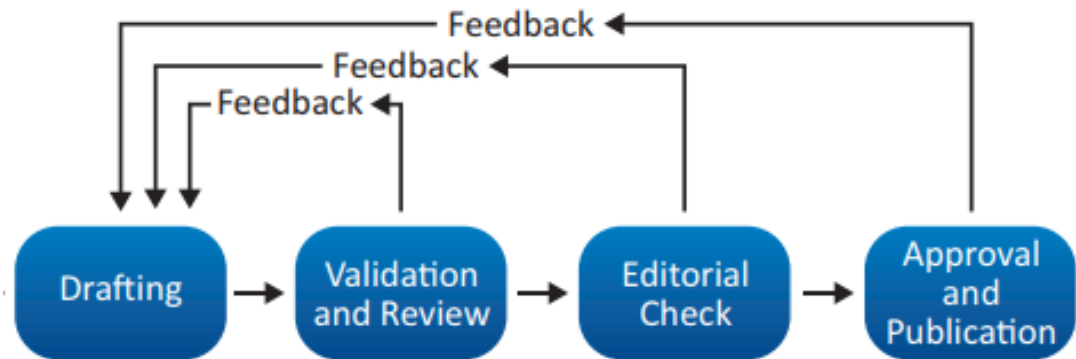


Technical Writing Ethics

- Language should clearly states who is responsible for what. [?]
- Correctly represents all data [?]
- Avoid language that could possibly mislead readers. [?]
- Treat the views of others fairly and professionally. [?]
- Clearly cites all sources used to write the report. [?]
- All recommendations and conclusions should be supported by facts. [?]
- All judgments, recommendations, or comments should be within the scope of the organization's policies. [?]
- Acknowledge and receive permission to use copyrighted information.

The Feedback Cycle of Technical Writing

At each stage there is the possibility of feedback



Formal Technical Report Structure

- The objective of a technical report is to clearly describe technical work, why it was prepared, results obtained and consequences of those results.
- The technical report serves as a means of communicating the work to others and possibly providing valuable information about the work.
- A well-written report is about **organization**. A technical report should be divided into several sections in a logical sequence that makes it easy for the reader to obtain an overview of the contents as well as find specific information.

Universal Aspects of Reports

- Apply active voice by using the third person in most instances.
- Avoid using personal pronouns.
- Use correct grammar, punctuation, and spelling.
- All diagrams must be neatly presented and should be computer generated.
- Use a computer software package, such as Paint, Multisim or AutoCAD, to draw diagrams.
- Leave at least a one-inch margin on all sides of a full page diagram and always number and title all figures.
- Any information that is directly quoted or copied from a source must be cited using the proper notation [1, 2, 3], for example.

Report Format

Title, Abstract, Table of Content

- **Title Page:** Report title, who the report was prepared for and prepared by, and the date of submission.
- **Abstract:** This is a brief description of the report including its purpose and important qualitative results. It must not be longer than half a page and must not contain figures or make reference to them.
- **Table of Content:** This includes all the report sections, subsections, and appendices.

Ordering Sections

There are different ways of ordering sections, for example:

- In sequence from most important to least important,
- In problem, method, solution sequence,
- In cause-and-effect sequence,
- In chronological (time) sequence.

Include an introductory paragraph or sentence at the beginning of each section To introduce its purpose and outline its main results.

Introduction

This section usually provides the reader with an overview of why the work was performed, how the work was performed, and the most interesting results. It should include answers to the following:

- What questions are being investigated?
- What is motivation for the work?
- What category of persons is intended to read the report?
- How was work performed?

Background Theory

- This is a discussion of relevant background theory.
- Include any preparation specified in the lab manual.
- This section may be divided into subsections if appropriate.
- Keep the discussion brief and refer the reader to outside sources of information where appropriate.

Analysis/Design

- This section provide the details of the design procedure.
- This work is usually described using sentences, equations, and graphs.
- It is not necessary to show every step.
- Sentences can be used to describe the intermediate steps.

Procedure

- This includes the procedure used to test a theory, verify a design or conduct a process.
- Make sure all diagrams provided are numbered, titled, and clearly labeled.
- Briefly describe the method employed to carry out the work. This is meant to be a brief description seizing the intention of the work, not the details.

Results and Discussion

- Present the results of the work performed using effortlessly organized and completely labeled tables and/or graphs whenever possible. When data is available, present the data in a way that facilitates the comparison. It is necessary to:
 - Accompany results with a meaningful discussion.
 - Discuss the possible sources of error and how accurate the results need to be in order to be meaningful.

Conclusion

- In this last section, everything is put together. It is similar to the abstract except that now the results are concluded upon in a quantitative way.
- The conclusion should be a concise description of the report including its purpose and most important results providing specific quantitative information.
- The conclusion should not contain figures or make reference to them. Similar to the abstract, the reader should be able to read this section on its own which means that there should be no specific technical details, abbreviations, or acronyms used.

Citation

Why Citation? To place report in context of existing documents; to mention background material that reader needs to know; to give credit for material that has been quoted; to add authority to a conclusion that is confirmed by another work.

When citing an article in a periodical, you must include:

- The author(s) last name(s), followed by a comma, and first initial (s), followed by a period.
- The year of publication and date, in parentheses, followed by a period.
- The article title followed by a period. Capitalize only the first word and any proper nouns.
- The title of journal, in italics, followed by a comma.
- The volume number in italics.
- The issue number (if available) in parenthesis, followed by comma.
- The pages followed by a period.

Appendix

- This section may not always be present.
- It contains material that supplements report body but not an essential part of the text.
- Materials included in an appendix may include lab sheets, parts list, diagrams, extensive calculations, error analyses, and lengthy computer programs.

Technical Presentation

- To create a good presentation, it is needed to demonstrate design skills, technical literacy, and a sense of personal style.
- **Informal presentation**
 - Ad hoc- few words summarizing the work
 - Probably no need for slides
- **Formal Presentation**
 - A project proposal to supervisors
 - A sales presentation to a prospective client
 - Oral summary of a report for a client
 - Will likely include visual aids such a slides, videos, posters.

Preparing a Presentation

- **Analyze your Audience**
 - What is the level of knowledge?
 - What level of detail do the audience expects?
 - What questions will the audience asks?
 - What is the main interest?
- **Topic and Message**
 - What is the main point(s) you want to communicate?
- **Time constraints**
 - How much time do you have?

Less is More

- Create the presentation body with clear examples and by using visuals effectively.
- Present data and facts; read quotes from experts; relate personal experiences; provide vivid descriptions.
- Know your stuff; do not read slides; time yourself and be ready to skip slides if time is short.
- Dress for success; speak clearly, loud enough and not too quickly; maintain eye contact with audience.
- Ask questions and stimulate thinking.
- Presentation is a story telling; be positive and keep it simple
- **Stay on time!**

Reflection

Ethical Considerations in Technical Writing

Honesty: Promote the public good in activities.

Legality: Observe the laws and regulations governing profession.

Confidentiality: Respect the confidentiality of clients, employers, and professional organizations.

Quality: Produce excellence in communication products.

Fairness: Respect cultural variety and other aspects of diversity in clients, employers, development teams, and audiences.

Professionalism: Evaluate communication products and services constructively and seek definitive assessments of professional performance.

Reflection

What is the Difference between Technical Communication and Technical Writing?

- Technical communication and technical writing are basically the same thing.
- Technical communication is a newer term that describes a field that is growing to include additional skills such as information design, user experience design and instructional design.
- Both fields share the same goal of creating clear and organized content that helps users to achieve specific goals.

Reflection

Case Study

- **Project Brief:** Develop a suite of online motivation pages to assist students and the public in one of the following topics or any one of your selection:
 - Defy the conventional
 - Typical engineering and sustainable engineering
 - Hierarchy of creativity
 - Habits of Mind
 - Creativity in the classroom
 - Think outside of the box
 - Disruptive innovation
 - Others

Reflection

Technical Writing and Management Skills

Assume you are working for a company that is rolling out a new piece of software. You are asked to write an online help, a printed manual, a quick start guide, and produce instructional videos for training.

How are you going to accomplish all done? Technical writers often need to manage multi tasks at one period of time. Developing good project management skills is as important in addition to good writing skills. Time management also plays an important role.