



Principles of SCIENTIFIC AND TECHNICAL WRITING

Dharani Sabba, Ph.D.

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Principles of Scientific and Technical Writing

Scientific writing is technical writing of scientific research findings typically by scientists targeting peers, researchers and scientists chiefly as audience. As knowledge will be lost without proper documentation, scientific writing is very important and should be clear, simple and well organized to meet the needs of publication. It encompasses types or genres such as peer-reviewed articles, technical reports and grant proposals, each serving a specific purpose and audience. Hence scientific writings leading to publications are imperative for both career advancement as well as for attracting research grants from funding bodies. Chapters 1-3 are compilations representing the importance and integrity of scientific writing in today's world while Chapters 4-5 focus on the general methodologies employed to improvise scientific writing. Strategies to write the various sections of a scientific paper for e.g. Introduction, Abstract, Conclusions, References, etc. are elucidated in Chapters 6-9. In Chapter 10, special attention is given to Plagiarism, a common pitfall by scientific or technical writers, and the various strategies to address it. Furthermore the scope of this book has been extended to biomedical as well as neuropsychological field of research in Chapters 11 and 12 respectively. As writing proposals for acquiring grants has paramount role in a research group, strategies for a successful grant application are produced in Chapters 13-14. Chapter 15 aims to examine the effect of blending virtual communities on writing apprehension and how can virtual communities facilitate meaningful communication. Chapters 16-17 provides an overview of the scientific and technical writing field as well as how technical writers are utilized by software development companies. In Chapter 18, an exploration of the scientific writing experience of nonnative English speaking doctoral supervisors and students using a phenomenographic approach is presented and a novel approach to support scientific writing with a tool called SciFlow is presented in Chapter 19. Succedingly, Chapter 20 aims to investigate how weblogs as well as microblogs can be used to enhance traditional lectures in Higher Education. A randomized controlled trial comparing standard, and on-line instruction and fundamental principles of scientific writing that also include a "style and grace" component are reviewed in Chapters 21 and 22 respectively. Chapter 23 responds to text clumping for technical intelligence and last Chapter aims to describe the Web application Manuscript Architect, designed to assist virtual interdisciplinary groups in the writing of scientific manuscripts. This book will be a useful resource of materials to amateurs as well as professionals who want to pursue a career in scientific or academic line. It will guide scientists as well as academic scholars to enhance the quality of their manuscripts, in communicating effectively, in publishing higher impact factor journals as well as to write grant proposals for the economic survival of research institutions.



Dharani Sabba worked as a Research Fellow in Energy Research Institute of Nanyang Technological University (ERI@N), Singapore, on investigating novel semiconductor and photoactive materials for opto-electronic applications. She also obtained her Ph.D in Materials Science from Nanyang Technological University. Her research interests encompass development and synthesis of novel nanomaterials, investigation of their properties and their application in renewable energy sector.

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Preface

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INTRODUCTION

In the technical world, writing remains the primary means of communicating plans, actions and outcomes. Writing out the conceptions so others can follow has the benefit of clarifying the thinking, it acts as the blueprint for implementation, and it captures the experience upon completion. Writing and action interdepend. If the written plan is defective so will be the action. If the action is ineffective, honest writing must report that. As the teaching adage goes ‘if you can’t say it (or write it), it’s not worth knowing’.

Scientific writing is writing for science. Science writing means writing about science, medicine, and technology for general readers. It appears in magazines and newspapers, in popular books, on the walls of museums, on television or radio programs, and on the internet. Scientific writing, like all formal writing, requires a firm foundation in English sentence construction, usage, and punctuation. Scientific writing follows certain conventions related to format, citation, design, voice, tense, concision and organization that may differ from writing in other contexts.

Technical writing is a unique and diverse field, which integrates itself in the field of all latest technologies on the face of the Earth. It is a creative and artistic field where one can expertise himself in all the cutting edge technologies. Technical writing is performed by a technical writer and is the process of writing and sharing information in a professional setting. A technical writer’s main task is to convey information to another person or party in the most clear and effective manner possible. The information that technical writers convey is often complex, and it is one of their main tasks to analyze the information and present it in a format that is easy to read and understand. A good technical writer needs strong writing and communication skills. They do not only convey information through text, and must be proficient with computers as well. They use a wide range of programs like Adobe Photoshop to create and edit images, diagramming programs like Microsoft Visio to create visual aids, and document processors like MadCap Flare to design and format documents.

While commonly associated with online help and user manuals, technical writing covers a wide range of genres and technologies. Press releases, memos, business proposals, product descriptions and specifications, white papers, resumes, and job applications are but a few examples of documents that are considered forms of technical writing.

Good technical writing is concise, focused, easy to understand, and free of errors. Technical writers focus on making their documents as clear as possible, avoiding overly technical phrases and stylistic choices like passive voice and nominalizations. Because technical documents are used in real-world situations, it should always be explicitly clear what the subject matter of a technical document is and what should be done with the presented information. It would be disastrous if, for example, a technical writer’s instructions on how to use a high-powered X-ray machine were difficult to decipher.

Technical writing requires a writer to extensively examine his or her audience. A technical writer needs to be aware of his or her audience’s existing knowledge about the material he or she is discussing because the knowledge base of the writer’s audience will determine the content and focus of a document. For example, an evaluation report discussing a scientific study’s findings that is written to a group of highly skilled scientists will be very differently constructed than one intended for the general public. Technical writers do not have to be subject-matter experts (SMEs) themselves and generally collaborate with SMEs to complete tasks that require more knowledge about a subject than they possess.

Technical writing must be accurate. A technical writer, after analyzing his or her audience, knows what they are trying to communicate. The goal from there is to convey the message in an accurate and ethical manner. Physical, environmental, or financial repercussions could result if a writer does this incorrectly. Knowing the audience is important to accuracy because the language will be tailored according to what they understand about the subject at hand. For example, instructions on how to correctly and safely build a bookshelf are included when purchased. Those instructions are constructed so that anyone could follow along, as well as accurate details as to where every fastener goes. If those instructions were inaccurate, the bookshelf could be unstable and result in falling, and possibly injure someone.

Document design and layout are also very important components of technical writing. Technical writers spend much time ensuring their documents are laid out in a fashion that makes readability easy, because a poorly designed document hampers a

reader’s comprehension. Technical document design stresses proper usage of document design choices like bullet points, font-size, and bold text. Images, diagrams, and videos are also commonly employed by technical writers because these media can often convey complex information, like a company’s annual earnings or a product’s design features, far more efficiently than text.

The Principles of Technical Writing

Well-written and accurate documentation plays a major role in any company’s customer support strategy because it helps to reduce support costs. Technical writing plays a big part in the support equation. Technical writing is much more than just technical jargon, and structured, concise instructions. As the intended audience for the technical writing could be for both technical and not-technical people it must to convey its message so that both sets of people understand it.

The main purpose of a technical writer when approaching a new technical writing project is to ensure that they maintain focused on what they are writing about. The information they are producing has to be organized and structured within the laid down style that is appropriate for the intended audience. By sticking to the basic principles of technical writing the technical writer is ensuring that the documentation is clearly understood by the reader.

The following is the six basic principles of technical writing that a technical writer has to take in to

Content

There are five basic questions a technical writer has to ask themselves when starting a new project – who, why, what, how and when. Answering these questions will allow the technical writer to be able to develop the content for any type of technical documentation. For example, let’s say the technical writer has to create a user guide for a new video recorder. Before creating the user guide, they will have to plan the content of the user guide by applying following key questions to the situation:

- Who will read the user guide?
- Why do need to create the user guide?
- What is this user guide going to offer its intended audience?
- How is the user guide going to be delivered?
- When does the user guide have to be ready (publishing date)?

The audience and purpose of the documentation

Before beginning any new writing project, the technical writer has to analyze the intended audience and identify the purpose for the document. The technical writer will need to ask the following questions about the audience:

1. Who will read the documentation?
2. What are their biases?
3. What responsibilities does the technical writer have when communicating the information to the audience?

With regard to the purpose of the documentation, technical writer will need to know what the documentation will accomplish and also what should it do.

Style guide

Technical writers will more than likely use a company styleguide (if there is one) to ensure that their documentation has a structured and organized pattern so that it gives consistency to their writing. A styleguide will provide the document with continuity so that the audience can comprehend the information. For example, technical writers need to organize their ideas in a specific chronological format because without a specific layout and structure to the documentation it will be very confusing for the reader to understand.

Writing Style

Technical writers will need to change their writing style depending on the audience and situation they are writing about. If they are writing technical documentation then it needs to be formal and devoid of any emotion as you get with creative writing. Whereas, if say they were an email to one of the senior managers involved in the project then their approach would more casual than formal.

Accessing the information

Accessibility applies to the ease at which the intended audience can gain access to the information they need from the technical documentation. A technical document must at least contain a table of contents, headers and footers, list of illustrations/tables, page numbers, etc.