

TECHNICAL WRITING FOR TEAMS



The **STREAM** Tools Handbook

ALEXANDER V. MAMISHEV
SEAN D. WILLIAMS

 WILEY

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TECHNICAL WRITING FOR TEAMS



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Sean Williams

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PREFACE

Business processes change continuously, becoming increasingly automated, especially in such areas as customer interaction, order handling, and marketing. Collaborative teams are now formed across continents, and everyone—from individuals to small businesses to global corporations—has to operate in this increasingly interconnected world to maintain their competitiveness. The field of research and development is no exception: the processes of producing and managing knowledge change as new information technology tools become available. One of these processes, the production of manuscripts—journal articles, conference papers, technical reports—is one of the most important activities in scientific and technical organizations and this process, too, has become highly automated.

Recognizing these changes, our goal for this book is to provide technical teams with tools that allow them to streamline their collaborative writing activities. Ultimately, this approach will not only increase the overall productivity of the group but will also enhance the quality of the output, the creativity in the organization, and the ability of team members to interact with each other.

In this book, we cover several key areas of manuscript generation: writing, editing, proofreading, formatting, and file management. Unlike most other writing manuals, we place specific emphasis on teams rather than on individual writers. Therefore, we address such areas as team dynamics, training, separation of duties, and workflow, while also focusing on the tools that will help team members collaborate more successfully.

One example of a team centered approach is the way we tackle writing quality. Becoming a great technical writer is a lifelong process. The rewards of writing well are great: winning large technical bidding contracts, getting your work published in highly respected journals, rapidly developing and protecting your intellectual property. With all due respect to many who have preceded us, like Strunk and White, we feel that today we have an opportunity to improve writing by focusing attention on specific areas that need improvement rather than discussing writing *in general*.

In short, this book presents a system that enables collaborative authors to unlock the potential of teams in creating the highest quality documents in a minimum amount of time.

Chapter 1 introduces the philosophy behind this book by examining the need for the system we present in subsequent chapters. The chapter offers a historical account of how our perspective has evolved, discusses why writing teams need a good “writing system,” and introduces the system itself. This chapter does not teach any skills, so your team can scan it quickly or even skip it entirely if you want to move directly into an outline of the system, which we present in Chapter 2.

We have dubbed the collection of approaches in this manual *STREAM Tools*, which stands for **S**cientific and **T**echnical **w**Riting, **E**ditng, and file **M**anagement. In addition, we developed a “minimum subset” version of *STREAM Tools* to meet the needs of busy collaborators who do not have the time or desire to learn the entire system. The manual you are reading is the current embodiment of *STREAM Tools*, a system that continues to grow and evolve as more groups begin to use the system.

There are two options in learning *STREAM Tools*: one for experienced writers and the other for the beginners. Experienced writers already know how equations should look and why a figure caption should be on the same page as the figure itself. These experienced writers can learn the basics of *STREAM Tools* in a quick 30-minute overview and will then be ready to co-author manuscripts with their colleagues using the system. Chapter 2 presents the shortest possible introduction to *STREAM Tools* by providing the minimum set of instructions that ensure reasonable compatibility among multiple writers.

Newer authors, as well as more experienced authors with little experience in collaborative writing, should consider reading Chapter 3, which integrates the document management advice specific to Microsoft Word with a general tutorial for achieving consistent formatting in your documents. This chapter outlines how different elements of a manuscript—such as figures, tables, or equations—should be managed and why a particular way of managing the elements will produce effective documents. The list of the most typical mistakes made by previous generations of beginners is included. Finally, Chapter 3 contains a collection of advanced tips and tricks at the end of each section to help experienced authors work even more efficiently.

Chapter 4 addresses how collaborators can integrate bibliographic databases into their projects. As writing teams conduct their research and develop their projects, inevitably they construct a large database of sources. This chapter outlines a method both for compiling these databases and also general procedures for drawing on the database as the team constructs its documents.

Chapters 5, 6, and 7 take a step back from the “Quick Start” approach and offer more detailed guidance on issues confronting writing teams. Chapter 5 presents a system for planning, drafting, and editing documents, which, in a way, provides the container for the entire system of *STREAM Tools* outlined in this book. For example, Chapter 5 discusses important concerns such as analyzing audiences, organizing content and naming files, and annotating documents using electronic editing tools. Guidelines and checklists for each of these stages of collaboration accompany the discussion so that teams can be sure they are operating as efficiently as possible.

Chapter 6 presents a detailed discussion of what components are necessary for successful writing teams. Like Chapter 5, this chapter contains multiple subtopics such as understanding how teams work, how to manage the work of teams, and how to work successfully at a distance. While experienced collaborative authors will have had some experience with these principles, we encourage all readers to review this chapter since it explicitly articulates a series of approaches that most authors have only intuitively learned. Most importantly, this chapter outlines a series of questions and methods for managing teams to maximize their effectiveness, and each set of concerns is accompanied by checklists and guidelines that serve as a quick reference guide for busy teams.

Most writers will find Chapter 7 to be a good review of quality writing. This chapter presents some of the most common challenges faced by technical writing teams and gives examples of these challenges. This chapter addresses the mechanics of writing, such as constructing strong sentences, choosing the best words, and punctuating for clarity. While the content of this chapter might seem like adornment when compared to the “real” work of writing, efficient writing processes must attempt to get things right the first time to avoid rewriting (at best) or confusion among co-authors (at worst).

Chapter 8, the final chapter, presents a business case for using *STREAM Tools* and addresses “frequently asked questions.” The chapter also includes some success stories about *STREAM Tools* that supplement the business case and demonstrate why the method can be so valuable for writing teams.

Our overarching purpose is to enable your team to begin writing quickly, efficiently, and with high quality, so we do not present extensive resources, references, and exercises throughout the book. Instead, we present many “take away documents” to help facilitate your process—checklists and guidelines that can be used separately from the book itself—as well as including a list of resources in most chapters so that interested readers can study these materials if they have time.

Finally, we invite you to visit the website that accompanies this book for additional information and to join the growing community of users already successfully collaborating using *STREAM Tools*. The central satellite website is streamtoolsonline.com. From there you can follow web links to additional websites.

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We would like to thank many individuals for their participation in various stages of this project. First, we would like to thank our families for their patience and understanding.

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We also would like to thank our students, those who were among the first to try and then help refine various collaborative writing techniques described here, and those who helped us conceive of the content that appears throughout. In particular, we would like to thank Julia Arp, Jill Bunch, Sarah Hershman, Kathy Jeep, Amy Jessee, Bing Jiang, Nels Jewell-Larsen, Xiaobei Lee, Jessica Lisenby, Matthew Nelson, Chih-Hsu Peng, Gabriel Rowe, Pamela Saunders, Meagan Schuver, Kishore Sundara-Rajan, Amanda White, Brian Verhoeven, Min Wang, Kenneth Yuen, and Aaron Zielinski.

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1

INTRODUCTION

In a given week, I probably only do about 15 minutes of real, actual work.

—Office Space (1999)

1.1 IN THIS CHAPTER

This chapter discusses the motivation behind the collaborative technical and scientific writing approach presented in this book. We touch upon the history and development of *STREAM Tools* and discuss common problems encountered by technical and scientific writers in order to set the stage for why *STREAM Tools* will help your team write better and more efficiently. In part, this introductory chapter should persuade you of the value that a structured, software-enabled approach to team writing brings to your projects. It should also enable those who already see the value of such an approach to best make a case for such a system to their collaborators.

Overall, this chapter is an elaborate expansion of the notion that as little time as possible should be spent dealing with the more mundane aspects of the writing process—such as formatting and redundant editing—in order to leave more time and resources for creativity and rigor in research and development.

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If your team is ready to begin using *STREAM Tools* right away because you already believe in the value of standardizing your group’s approach to writing or have experienced the challenges of collaborative authorship without such a system, then reading this chapter is probably unnecessary. Skip directly to Chapter 2 and begin there to initiate your writing project.

1.2 OUR AUDIENCE

Our audience includes scientists, engineers, technical managers, students, professors, grant writers, and administrative assistants—technical professionals who produce complex documents as part of their jobs, especially those who work and write in teams. In principle, any technical professional can utilize *STREAM Tools*, whether working alone or in a team, but since the majority of complex technical work occurs in teams, we emphasize the ways that *STREAM Tools* can help multiple collaborators streamline their writing activities.

Finally, all members of our audience share some characteristics regardless of their position, title, or specialization: they are busy professionals who demand excellence and efficiency and wish to maintain great relationships with their collaborators. *STREAM Tools* enable our audience to meet each of these objectives.

1.2.1 A Few Horror Stories

First, we would like to include several anecdotes about the challenges that led *us* to begin thinking about ways that we could improve our own collaborative writing. Some readers will readily identify with our stories and could quickly contribute their own similar accounts. Here are a few stories to set the stage:

Professor Mamishev, University of Washington:

We were submitting a large multi-university proposal to the National Science Foundation. The lead writer was at another institution. I sent my contributions to the proposal and was waiting for the compiled version of the manuscript to review. When the file finally arrived, I realized that some critical figures were taken out during the editing stage. Without these figures, the ideas were not communicated clearly. I wrote a new version, with the figures included and text shortened to keep the total length of this portion unchanged. Even though there were still many days left before the submission, the reply from the lead writer was adamant: “We have already numbered the figures, and at this point it would be too much work to change the structure of the manuscript.” Needless to say, we did not get funded at that round.

Professor Mamishev:

Having almost had completed my Ph.D. dissertation at MIT, I had to tie up some loose ends in my graduate education. One of them was submitting a report to the foundation that had sponsored my dissertation research for one year. The requirements from the foundation were very clear, and the foundation officers were adamant—the report should be in Microsoft Word format. This would not have been a big deal, except that I wanted to adapt materials from my dissertation, which was written in LaTeX, a

typesetting system widely used at MIT. More than 700 pages of non-stop entertainment. That is, if you consider design of fringing electric field sensors entertainment. I did ... Anyway, I had to bite the bullet and sit in front of the computer screen for two days straight reformatting chapters, sections, figures, and equations, finally producing a document that looked pretty much exactly like a few chapters of my thesis—the content did not change at all. Two days of my life. I felt that they could have been better spent.

Professor Williams, Clemson University:

A few years ago, I was hired as an outside expert to help a large bank organize some of their internal documentation regarding a specific internal product. The team I led, composed of a group of subcontractors and a group from the bank, had a very short timeframe in which to deliver our project since the product was going to be rolled out to the entire company in three months. At that time, the subcontracted technical writers were located in three different states, the client was in another state, and I was in the fifth state—all of which made face-to-face collaboration nearly impossible. To complicate matters, the documents provided by the bank were in “old” word processing formats like Word Perfect; some were handwritten on paper; yet others were in PowerPoint, Microsoft Word, or Adobe PageMaker. Finally, the documents contained large numbers of figures and tables, all of which were numbered inconsistently at best. Combine the complexity of the documents we received with the multitude of formats, plus the challenges of working at distance and the pressures of completing the project under a tight deadline and you can imagine the stress the team felt as we squandered hours debating how we would produce the final document set and in what software package. Let’s just say that the result of this chaos was that I have not been invited to bid on another project for this client.

Gabe Rowe, large semiconductor manufacturing firm:

I often write technical memos for the company I work for, but I am one of the few employees who use autonumbering for figures, tables, and cross-references, or who takes advantage of Styles and Formatting options. I am able to make a small change and quickly shoot out a new version of the memo while other people have to go through and manually update all of the references to figures. It’s funny. These Microsoft Word shortcuts are old technology, but very few people know how to use them. It makes me think that there really should be more training on this kind of stuff.

Nels Jewell-Larsen, graduate student, University of Washington:

In my first year of graduate school, I only had to write short conference papers and simple reports, so there were no difficulties putting them together. Once I had to write a thesis, things suddenly changed. For several days, I was struggling with the document formatting, completely abandoning all other aspects of the project. There were so many figures, tables, and references to keep track of. At this point, I had no choice but to learn the document design principles used by more senior graduate students in our lab.

Kishore Sundara-Rajan, graduate student, University of Washington:

During my first year of graduate school, I was required to submit a literature search report for a class. I had written a five-page paper, and during one of the numerous revisions of the paper, I introduced new figures and citations in the middle of the text. This required that I renumber all of the following figures and references in the manuscript, and I was positive that I had managed to do that just fine. I was surprised when the professor gave me a low grade and returned the paper with a note that I hadn’t

entirely understood the field. It turned out that I had not changed a few citations and reference to the figures in the body of the text during the changes and as a result, that paper was incomprehensible. I could have saved myself a lot of time and pain had I adopted an auto-numbering system. Needless to say, once I began using the system, my 130-page master's thesis was a breeze to edit and revise.

These situations demonstrate why a system like *STREAM Tools* can be helpful. Yet, on the other hand, some might argue that their experiences with collaborative writing have been more positive and, in fact, we've had good experiences as well. But our purpose in telling these stories is to encourage people to look beyond their personal desktop. Perhaps everything is running smoothly in your office or with your specific team, but is it true for your organization? Perhaps you have mastered the tools of the writing trade, but your students or junior colleagues spend enormous amounts of time preparing their documents and therefore are not as productive as they could be. Maybe you do not worry about writing efficiency because your organization has administrative assistants who pick up the loose ends, but if you looked closely, perhaps the hidden costs are mounting up. In all, this book hopes to outline a process, *STREAM Tools*, that will be useful across your organization, to all those impacted by writing, so that everyone can work more successfully, regardless of their level.

1.2.2 Some History

Most technical writing guides are not tied to any particular software practices. They follow a sensible philosophy: “Here are your audience analysis paradigms, your composition principles, and your grammar rules and you can use your favorite software to put your ideas down on paper.” In this book, we depart from those other guides and explicitly recommend that writing teams utilize Microsoft Word. We recommend Microsoft Word primarily for practical reasons: it is simply the easiest to use, the most widely available, and it has enough functionality to meet the needs of nearly every collaborative research team. Why struggle within your team to decide which software packages to use when others have already done it for you? We also recommend Microsoft Word because *STREAM Tools* uses a holistic approach in which considerations of grammar and style are closely linked to other aspects, such as editing, collaborative writing, document design, and document management; Microsoft Word enables each of these aspects with relative ease.

Even with these arguments, some of our more dedicated LaTeX users might require a bit more persuasion, so let's start with a brief history about the evolution of LaTeX and Microsoft Word and then attack a few myths.

Let's start with the 1980s. Early versions of Microsoft Word were running on computers that could not hold a large document in RAM. Writers could only work with small documents with limited graphics, and even then, the operating system crashed frequently and unpredictably. At that time, writers designed a document in a text file using an HTML-like language and then compiled it into a postscript file that would then output to a printer as formatted in the markup. At that time, “serious” academic writers chose LaTeX for their scholarly work and reserved Microsoft Word for letters,

memos, short papers, and other ephemeral communications. As computers became more powerful and software companies eliminated bugs from mainstream typesetting packages, Microsoft Word started gaining ground with writers of large manuscripts.

At the same time, document management systems evolved from passing floppy disks among team members to sending emails, placing files on FTP servers, and using sophisticated collaborative environments like wikis or SharePoint. Today, all these methods coexist in some form (floppy disks have been replaced by USB flash drives). While the myriad of choices available for document management are not bad in themselves, it poses a serious challenge to collaborating groups. Incompatibility of writing processes and document design methods slows down manuscript production enormously.

Computerized offices have also led to the elimination of most secretaries and typists from the workforce. Two decades ago, technical professionals would rely on highly trained secretarial staff to ensure that their writing adhered to proper form. Typed manuscripts would be prepared for offset printing by yet another set of professionals, who possessed a detailed knowledge of fonts, margins, Greek letters, serifs, line widths, etc.—the multitude of details that make up a professional publication. Today, the burden of such knowledge rests squarely on the shoulders of technical and scientific professionals, as in most cases, the professional submits the manuscript directly to an audience without intervening document production experts.

1.3 THE NEED FOR A GOOD “WRITING SYSTEM”

Given the complexities presented by collaborative writing situations, adopting a good writing system will enable your team to work more efficiently and produce higher quality documents. In short, technical and scientific writing teams often struggle to produce their documents because they get wrapped up in debates about details—debates that greatly slow down document production, but in the end, have little impact on the document’s final quality. Dozens of methods, tricks, and practices for streamlining the writing process evolve in different research groups as each team seeks to maximize the time they spend on their research and development activities. Each time a member joins a new project team, all of those “rules” must be relearned, slowing down the writing process. In addition, publishers, journal editors, and conference organizers develop sets of rules most suitable for their fields, adding further complications to the strategies that teams create. Adhering to the standards of a particular academic society is important. Your work will not be read—no matter how good it is—unless it meets the requirements of a publisher or a particular society. We’d wager that most teams would prefer to spend time on matters more profound than debating which software package to use or which set of conventions to follow. Unfortunately, in reality, many teams spend inordinate amounts of time on these very tasks they’d like to avoid.

Given the challenges faced by research groups, providing a standardized framework for approaching collaborative writing practices is quite important. For example, the same text and graphical information must often be adapted for research reports, conference papers, theses, proposals, presentations, and internal memos. Additionally, multiple authors, communicating electronically, might contribute to these documents,

making an effective, well-organized writing system essential for creating a successful document.

Check any of these statements that apply to you:

- I spend excessive amounts of time formatting documents.
- I need to write a long manuscript (thesis, book) and I am finding it difficult to keep track of document structure and numbered items, such as figures, tables, and references.
- My boss (advisor, professor) is never happy with my writing.
- I spend excessive amounts of time editing documents written by my subordinates, and yet they never seem to improve.
- Just as soon as my subordinates (graduate students, grant writers) get adequate training, they leave for other jobs and the writing process haunts me again.
- Our collaborators use all kinds of word-processors—LaTeX, Microsoft Word, Open Office, plain text, Google Docs, etc.—which makes it rather difficult to merge material from different contributors.
- Our group frequently misses manuscript (paper, report, proposal) submission deadlines.
- Our papers and proposals often get rejected due to low quality of writing, even though the content is quite good.
- Our institutional knowledge (group knowledge, tribal knowledge) gets lost because of high turnover of group members.
- We need an effective process to reuse our existing documents (legacy content).

No matter where you find yourself in your career, developing strategies to manage many of the problems noted above will help propel you to success. The techniques presented in this book will help you overcome the challenges previously noted and enable you to improve both the quantity and quality of the manuscripts generated within your organization. *STREAM Tools* will not only help you to manage your regular workload, but it may also help you advance in your career as those around you begin to see your success at managing complex writing projects.

1.4 INTRODUCING *STREAM TOOLS*

1.4.1 What is *STREAM Tools*?

STREAM Tools is a collection of best practices for use by scientific and technical writers. *STREAM Tools* also utilizes an integrated approach to collaborative writing in which specific software tools are integrated with writing quality and team interaction through a flexible collection of stand-alone modules that enable users to choose elements most relevant to their work. Although many *STREAM Tools* elements are valuable for individual writers, the system is most beneficial when every collaborator in a

STREAM Tools

	Writing Quality	Document Design	File Management
Focus	Style Grammar Content Adherence to standards	Time-effectiveness, especially with long documents Camera-ready output Making sure that writing quality is not hindered by typesetting issues	Re-use of legacy content Simultaneous content generation by multiple contributors
Methods	Coded feedback Continuous improvement Layered editing Checklists	Autonumbering of figures, tables, headings, etc. Paragraph style control Advanced equation editing Shared references databases	Network file-sharing Version management and naming conventions Workflow optimization
Software	Microsoft Word	Microsoft Word MathType EndNote or Reference Manager CorelDraw or Visio	Wiki Sharepoint Google Docs

Figure 1.1. Overview of *STREAM Tools*

team adopts it. With *STREAM Tools*, the whole is greater than the sum of the parts. Figure 1.1 shows the overall structure of *STREAM Tools*. The *STREAM Tools* system addresses three areas: Writing Quality, Document Design, and File Management. Within each area, writers are asked to go through an evaluative process, first determining the *focus* of their efforts, in other words, identifying the areas that need most improvement. After that, the writers learn the *methods* most applicable to addressing their specific areas of need. Finally, the writers select the *software* most suitable for the selected methods. Each writing group is unique and will benefit from a unique and custom-tailored combination of tools. *STREAM Tools* is meant to help with the process of choosing the best tools for each specific group.