

TECHNICAL WRITING PURPOSE AND PRINCIPLES

Introduction

We have two primary reasons for writing this forum article. The first is to remind readers of the benefits and goals of clear writing, particularly for their own papers and technical notes submitted to the *Journal of Hydraulic Engineering*. The second reason is to review a few recent developments related to teaching (and learning) technical writing.

A common factor contributing to the low rate of first-time acceptance for papers submitted to this and most other journals is that, too often, papers simply are not well written. Though the essential information in many papers might be valuable, foggy writing quickly devalues the information, not to mention frustrating readers.

A review of one of the many published books on writing style gives us an opportunity to summarize what we have found to be some of the most helpful principles of clear writing. Concise and powerful technical writing does not happen by chance, nor does it spontaneously manifest itself once we have something important to say. Rather, clear writing is built up by the careful arrangement and assembly of ideas into a coherent whole, in much the same way that the hydraulic elements in a water supply network serve a larger purpose than simply transporting water through a network of tubes.

Purposes and Benefits of Technical Writing in Research

We write for a variety of reasons. Generally speaking, we may write for the sheer pleasure and satisfaction it gives us, or simply because it is a responsibility we hold in our work. When our intention is to submit an article for publication in a journal, we often set a specific set of objectives that we want to reach. Starting with the most obvious, the goals of technical writing may include any or all of the following purposes:

1. We may write to inform others of new ideas, so they may benefit from our insight and understanding. Such writing may be used to summarize findings, to posit hypotheses or theories, to confirm speculations, to reject previous approaches, to describe important information, to explain findings, to warn of dangers or inaccuracies, or a variety of other tasks.
2. One goal of writing may be to preserve a place in the precedence of ideas. That is, the goal is to document and confirm achievements so they will be recognized by others.
3. Another important goal of writing for a scientific journal may be to benefit from the review process itself. Our submission of a paper enables other researchers (e.g., reviewers and editors of journals) to formulate a critical opinion of our work and to suggest improvements or corrections. This procedure can produce a good discourse within the research community and be a particular benefit for young researchers at the start of their careers.
4. Finally, the challenge of producing clear writing can also be of great personal benefit—that is, the writer herself can benefit from the task of presenting her ideas in a coherent form (Zinsser 1988). In particular, the task may result in a refined ability to think clearly and critically about certain problems, or about the work of others. It may create a chance to gain a deeper understanding of a problem or an opportunity to formulate new ideas from old ones. In fact, it has been said that you do not know whether you understand something until you try to write about it.

Thus, there are a lot of reasons for writing clearly. The question, of course, is how to accomplish this task. Traditionally, students have learned to write by being exposed to good and bad examples of writing, by rules of thumb, and through the editorial efforts of their peers. Certainly, this approach has allowed some students to learn the craft of writing. However, even as there are principles of fluid mechanics that apply to an incredible number of engineering applications, so are there principles of clear writing that apply to many kinds of writing too. We consider some of these next.

Principles of Clear Writing

In his book entitled *Style: Toward Clarity and Grace*, Joseph Williams outlines a number of important principles for clear communication. What we like so much about this book is its own clarity; Williams shows not only what a person tries to achieve when writing, but how clarity is achieved in writing.

To illustrate Williams' general approach, we have extracted and adapted here three simple principles of clear writing. The principles are as follows:

1. Set the context.
2. Identify the characters and their actions in a sentence.
3. Move from the known to the unknown.

Set the Context

The first of the three principles pertains to the decisions a writer has to make when establishing the context of his work. Before sitting down to write the actual piece, the writer must first identify what will interest the prospective reader and why. Will practitioners or academicians read this paper? Will the person read this paper to muster ideas for his own research, or to learn how to perform a certain type of analysis? Does the writer intend to overthrow an existing approach and strongly critique the current state of the art? Once the writer can answer questions of this sort, he can start delineating the discussion of the paper, so that it caters to the reader's chief interests (Campbell 1992).

Perhaps it is a fair admission to say that reviewers of a paper can be an especially tricky audience. Reviewers typically become impatient when they read papers that present them with too much or too little background information. This situation creates a difficult challenge for writers and partly explains why so few journal papers are accepted on first submission. Nevertheless, when a writer faces these tensions seriously, her chances of success increase.

Having conceived a clearer idea of what to write, the writer can then establish the circumstances and goals of the research. In most scientific travails, this is achieved primarily through a literature review. Usually, the writer will outline the research developments that have led up to his work in order to shed light on its purpose, significance, and unique contribution. The literature review also affords the writer with an opportunity to define terms, describe key concepts, and provide other precursory information that might help the reader make sense of the ensuing discussion. After completing this preliminary leg-work, the writer should move on to state the paper's main argument(s) and thesis. It is crucially important that the thesis statement be clearly written, as it affords the reader a good sense of what is discussed in the rest of the paper.

Tell a Clear Story

In his book, Williams exhorts us to write as if we were telling a story. Contending that the story is an effective means

to convey information, he advises a writer to treat the logical unit of the sentence as a story—complete with its own characters and the actions they perform. Indeed, the author's writing will seem clear if she is able to properly align the characters in the story or sentence with the actions they perform. Williams claims that to achieve this sort of clarity, the author must transpose wisely the characters and their actions to their grammatical analogues—the subject and verb. To achieve this end, he offers two very simple principles writers can follow in order to write a clear sentence:

“Readers are likely to feel that they are reading prose that is clear and direct when

- (1) the subjects of the sentences name the cast of characters, and
- (2) the verbs that go with those subjects name the crucial actions those characters are part of.”

The strategy used to align both sets of elements is clearly depicted in a figure found in Williams' book and reproduced here in Fig. 1.

According to Williams, the extent to which a writer's style is judged to be clear largely rests on his ability to align the main characters and actions with the subject and verb of a sentence. When a writer writes in this way, he will likely produce sentences that are free of abstractions and nominalizations—two elements, if misused, that tend to dislocate the characters from their respective actions and confuse the underlying structure of a sentence. Williams summarizes this point quite eloquently with an insightful diagnostic appraisal:

“When you align subjects and characters, verbs and actions, you turn abstract, impersonal, apparently expository prose into a form that feels much more like a narrative, into something closer to a story.”

It is that simple: to write clearly is to write a story.

Build a Pontoon Bridge

As important as it is to write clear, unambiguous sentences in a structure that resembles the narrative form, a writer must

SUBJECT	VERB	COMPLEMENT
CHARACTERS	ACTIONS	_____

FIG. 1. Aligning Elements of Character + Action with Their Grammatical Analogues of Subject + Verb + Complement

also be able to organize sentences into a coherent whole to convey his ideas and arguments effectively. The key to achieving both a coherent and cohesive style lies in the way we manage the flow of information in the succession of sentences we write. To write in a style that flows and that is “easy on the eyes,” Williams suggests we follow what he calls the two complementary principles of cohesion:

“Put at the beginning of a sentence those ideas that you have already mentioned, referred to, or implied . . . Put at the end of your sentence the newest, the most surprising, the most significant information. . . .”

In other words, when writing a sentence, one should always try to move from what is known to what is unknown. Writing in this style is akin to building a pontoon bridge. To cross a river, the bridge builder must lay his bridge segments in a sequential fashion—first laying and securing a segment before turning to the next one, lest the whole structure be washed away by strong currents. The idea is to consolidate what has already been built—whether we are speaking of bridges or sentences—and then move forward into new territory by adding to what is already there.

Conclusion

There is, of course, much more that could be said. Of particular interest to us are the many “rules” of writing that Williams debunks, such as the simplistic advice of avoiding passives or the common preoccupation with “that” versus “which.” Unfortunately, we simply cannot elaborate here the many other devices of clear writing. However, to learn more about this subject, we encourage the reader to refer to Williams' excellent book and other useful references on the subject of writing style. Also, we hope that, with a little luck, this brief article may help lift the success rate of papers submitted to the *Journal*.

APPENDIX. REFERENCES

- Campbell, C. P. (1992). “Engineering style: striving for efficiency.” *IEEE Trans. on Prof. Communication*, 25(3).
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