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Editorial

Technical Writing: The Vivid and Continuous Dream

LISP is now one year old, and this is a good time to recall that a scientific journal is a forum to highlight individuals and groups in their capacities not only as scientists but also as writers. What is required for good writing?

Over 2300 years ago Thucydides wrote:

A man who has the knowledge but lacks the power clearly to express it is no better off than if he never had any ideas at all

Your job as a writer is to not only convey your results, but to convey it so that the reader can incorporate your thoughts into his. Whatever you are writing, good and careful writing has two important qualities: it must be *vivid* and it must be *continuous*.

In a vivid piece of writing the mental images that the writer presents are clear and unambiguous; what the writer writes about should appear in our "mental dream" exactly as if we ourselves were thinking the thoughts he is describing. When the writing produces this clear image we can absorb what he writes with little effort.

In a continuous piece of writing there are no gaps or jumps from one topic to another. The image that is produced by the writing does not skip around. In technical writing, the problems and questions we have about the subject are answered as soon as we formulate them in our minds. That is, as we read a piece of technical writing we are constantly imagining the details of the subject matter. Sometimes our image is confused because we are not sure how some newly presented detail fits in, or we are uncertain of the best consistent interpretation. At this point the writer is obligated to jump in and settle the matter or provide a clarification. This way we do not have to stop and think, or go back to re-read a passage.

Insofar as our image must be vivid, it must also be continuous. If our image is discontinuous it cannot be vivid—it is blurred or muddy at the point of discontinuity. Similarly, if our image is not vivid it must be discontinuous—we are apt to stop and wonder about the source of blurriness, and at that point our image stops being continuous.

If I expect you to understand my writing without problems, I must do two things: I must anticipate what you know about the topic of discussion, and I must anticipate the problems you will have comprehending how my sentences and paragraphs are constructed. As you read from left-to-right, every word must fit in properly; you must never be forced to re-read parts already seen, and you must never have to reflect on my sentences. The text must be transparent.

These two aspects form the ends of a spectrum of concerns that a writer who cares about good writing must consider each time he writes. At one end is the correct decision about what is shared information, and at the other end is the effortless transmission of new information and relationships between facts. I will illustrate these two aspects with an example.

Consider writing the directions on how to get from one place to another in a car. When I tell you how to get to my house, I must know how much you know about the area; I must be certain you know where the Locust Street Eisner's is. If you do not live in the area, then perhaps the specific landmarks I use will be impossible for you to recognize. But if you do live in the area, I can use phrases like, "go the the stadium on Welch Road, and then. . . ." In short, I must carefully reason about what shared information we have about the area and also about what information you will learn while you are traveling through the area following my directions.

If I have tried to explain the directions to you in the past, then I can refer to that conversation or to that document. In short, there can be some common context and shared information about my explanation. My writing of the directions to you must accurately refer to the knowledge I am sure you have. If I refer to something that you don't know or to something that you could find out with some difficulty as if it were something you knew, then my directions would be bad.

At the other end of the spectrum, I must anticipate where along the trip you will become uncertain that you are on the right track. If there is a long stretch of road to traverse after several tricky turns, I must tell you sights that will alert you that all is well. If I say to turn right at the third stop sign, and it is behind a bush, I must warn you of that, or else you will likely have to re-do that part of the trip.

My directions will not be less accurate for this extra information, but this information will help make them better directions.

If you are not certain that you understand my directions, then you will perhaps become confused and begin to doubt that landmarks that you see correspond to landmarks I describe in my directions. You will think, "would he describe this tree like that?" or "could this red house be the pink one to which he refers; his directions are so confused that maybe he's simply being sloppy here?"

If my decisions about what is shared information are bad enough, then you—the reader—will find that my writing is difficult to read; you will try to find the correct reading of the text that makes it all clear. And, if my text is simply confusing, then you will wonder whether we agree on the facts; you will think that, if you could only know what I—the writer—knew, then the text would become crystal clear.

There are many ways that shared information comes into play in good writing. Obviously facts that I assume that the reader knows ought to be facts actually known to the reader. If the facts I assume the reader knows are not clear to the reader—if they are difficult concepts, or if the implications of the facts as they bear on my discussion are difficult to grasp—then it is my obligation as a writer to make the facts clear, even if that requires repetition and tutoring.

My text may introduce information that is crucial to understanding the rest of the piece, Not only must I carefully present that material, but in my subsequent references

to it I must be sensitive to the fact that the information was recently learned—perhaps it was forgotten or even skipped over. I should never treat information that I have introduced the same way that I treat assumed facts. For one thing, if I treat the information I have introduced exactly as the information I assume the reader has known for a while, then the reader may believe that I am talking over his head by falsely assuming his knowledge is greater than it actually is; and maybe the reader skimmed the presentation of the new material and doesn't realize that the later, confusing reference to it is a reference to new and not old information.

It is often helpful for the reader if the writer, when he refers to possibly puzzling information, refers to the information in a clarifying way. If every reference adds to the comfort the reader has about the material, the new material will be better understood.

The writer has an obligation to the reader: The reader chooses to read the piece. It is rarely the case that a reader is truly forced into reading a piece of writing from beginning to end. The writer's obligation is to make the reader's task easy enough that the reader will want to read the entire piece.

Beyond what I assume my reader to know, and beyond what I tell him, there are the actual words, phrases, sentences, and paragraphs with which I choose to pass that information to him. In bad writing the "mental dream" is interrupted or chafed by some mistake or conscious ploy of the writer. Whenever a reader is forced to think about the writing, the words, the sentence structure, or the paragraph structure, or whenever the reader has to re-read a section of writing to understand how the words relate to each other, it is at this point that the transfer of information from the writer to the reader is stopped, and the dream that accompanies this transfer dies. The dream must be re-established, and this can take extra time that could be better spent continuing a line of thought.

A second effect of such bad writing is that if a sentence has incorrect syntax, or if it is clumsy and difficult to understand, then the reader is justified in losing respect for the writer, in questioning the intelligence of the writer and his judgment, and in lowering his estimate of the importance, significance, and corrections of the entire piece of writing.

Finally, technical writing requires examples and concrete details to be understandable. When we write about a computer program, we probably have thought about that program for a long time, and we have internalized its characteristics to help our own mental processes. When the reader reads our description of it, he wants to build a mental image of the program and its operation, and we hope that his mental image is similar to ours. Without specific details the reader cannot imagine the program accurately, and it is even possible that his image is inconsistent with ours. In this case, the reader will have to adjust to the newer image once he discovers the discrepancy, if he ever discovers it.

Good writing is an act of communication between a writer and an unseen reader. Good writing is a courtesy that is expected by the reader, and if a reader puts my paper away because he cannot handle the writing, I have failed my duty to that reader. Similarly, I have little respect for a writer, regardless of his professional stature, if he

will not take the time to think carefully about how he presents his work and results to me.

If a writer will not be courteous, then at least let him be efficient. An article has many more readers than authors. Why make many readers expend effort to decipher poor writing? It is only sensible for the writer to expend the effort instead to make his writing clear. And if he does not—well, then perhaps the article will have more authors than readers, after all.

As editors-in-chief of LISP, we have the responsibility to select papers and to work with authors not only for solid and useful content but for clear presentation. We have been pleased over the last year to publish articles that we believe present good ideas well. We will continue to work for excellent writing in future issues.

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