

Advice on Technical Writing

By Rich Sutton

A collection of advice on technical writing as in a dissertation or scientific paper. Comments welcome here on this google doc.

Perhaps the most important thing is getting the order of ideas right. I have three rules for that:

1. Say *the most important thing first*, or as soon as possible consistent with the other two rules
2. Don't say anything before it can be understood
3. Show your intent early

The goal in technical writing is to be *precise* and *concise* (and plain)

- Omit unnecessary words and ideas
- Avoid metaphorical language
- Avoid superlatives that weaken (like "very")
- Beware careless exaggeration
- Don't say anything that is Arguably Not True (ANT)
- Don't say anything whose Opposite is Also True (OAT)
- Words should be used for their *literal* meanings

Separate what can be separated; complete what can be completed; these let the reader rest and free their short-term memory; separate:

- prior work from your work
- algorithms from environments
- problems from solution methods
- results from conclusions (using tense)
- exposition from argument
- speculations from claims
- what you have shown from what you have suggested
- your motivations from your ambitions

Use tense consistently and thoughtfully, to make distinctions

- Algorithms, environments, ideas, issues, and conclusions should be in *present* tense
- Experiments and results should be in *past* tense
- Use tense to telegraph whether you are describing results (past tense) or drawing conclusions from your results (present tense)
- Save future tense for what is *real future*. Don't use it for things that just appear later in the document

Your choices of vocabulary are critical, particularly in a long document such as a thesis

- Oftentimes explicit definitions are needed and helpful
- Use definitions to say what *you* mean by the words in *this* document
- Use italics for definitions

- Even if you are not making a formal definition, it is helpful to allocate words to ideas
- When assigning a word to an idea, it is usually best to explain the idea first, then attach the word (rather than the other way around)
- Imagine you have a jargon budget (try not to define too many things)

Mind the elementary rules of usage, including:

- Use a comma before 'and' only when connecting independent clauses (which have their own subject)
- Use 'that' and 'which' correctly (one *specifies*, the other *notes*)
- Use commas (or parentheses) around parentheticals
- Amongst near synonyms, choose the most specific word for your meaning. For example, don't use 'since' for 'because', or 'continuous' for 'continual'.
- Use the short forms 'i.e.' and 'e.g.' only in parentheses, and always followed by a comma
- Use the Oxford comma (as in a, b, and c)
- Never use a citation as part of a sentence
- Use citations thoughtfully (what is their meaning? Is it clear?)
- Don't cite a textbook for an idea unless it's the original source
- Use quotation marks only for genuine quotations; no scare quotes!
- If a sentence has an 'if', then it should always have a 'then'
- Punctuate equations so that they are parts of the sentences
- If a sentence is completely clear without commas, then it may be best to omit them
- Don't begin a sentence with mathematical notation or an equation number
- Every rule has exceptions, but first learn to follow the rules
- Numbered things, like Chapter 3, are capitalized. Same for Section, Figure, Equation, Table.
- If you number your equations like (3), then refer to them like (3)

Paragraphs are the primary unit of composition

- One clear topic per paragraph
- Set the tone for a paragraph with an initial topic sentence
- Or build to a final topic sentence
- The ideal is that your paper can be understood by reading just the topic sentences of each paragraph.

Generally:

- Find the simple essence!
- Expect to re-think and re-write until your paper is as simple as it ought to be
- Find your voice; stand with your reader; you know some things they don't, so you are telling them
- Avoid weak verbs (like 'has' and 'is')
- You lose half your readers with each equation
- Bibtex hides from the writer what the reader will see. It causes weak, unclear citations and errorful, inconsistent references. Escape from the Bibtex virus.
- Use name and year in citations whenever possible

- Use lastname, initials (year) in references. \bibliographystyle{apalike}
- Don't put your citations and links in a different color

[Abhijit Gosavi](#) and [Michael Littman](#) also offer some useful advice.