Frequent Errors in Scientific Writing

Stefan Lengauer

Version 0.3, March 13, 2026

This checklist constitutes a list of bad practices I encounter in almost every Seminar Paper, Bachelor/Master thesis, or research paper I had the pleasure to review[1][2]. For most I provide strategies on how they can be avoided. Some of them are specific to the usage of LaTeX while others are general recommendations. If you want to have targeted feedback, please make sure that your submitted work is reasonably free of these errors.

① **Usage of Acronyms** Acronyms should be introduced upon their first usage with the expanded version followed by the abbreviated version in brackets.

- Do not re-introduced already existing acronyms.
- If a concept is abbreviated, introduce the acronym on the first usage.
- Once introduced, do not use the expanded form.

If LaTeXis used, I heavily recommend to use the `glossaries` package. With that acronyms can be simply define with a handle:
`\newacronym{handle}{abbreviation}{long form}`. In text the expansion is handled automatically by just using `\gls{handle}`. For automatically handling pluralization, the package also supports a plural version: `\glspl`. Yet, as this na ively appends an 's' to form the plural, the plural form for terms ending with an 's' (e.g., Histogram of Oriented Gradients) must be set explicitly through the flags `shortplural`/`longplural`. Use `\glsdisablehyper` to prevent LaTeX from inserting hyperlinks for every acronym.

> Pro Tip
>
> Sometimes an acronym is used only a single time. In such cases omitting the abbreviated form can reduce the text's complexity and improve readability. The `glossaries` package provides a setting for counting the usage of acronyms, which can be set with `\glsenableentrycount`. In conjunction with `\cgls` this can be used to automate this behavior.

② **Smart Quotes** For the LaTeX compiler to render quotes correctly (i.e., opening/closing quotes), `` ` `` and `'` and ``` `` ``` or `''` must be used for single- and double quotes respectively. Do not use `"`!

> Examples
>
> ✖ "Some relevant quote" | ✔ ``Some relevant quote''

③ **Language**

Consistency Do not mix US and UK English. E.g., color vs. colour or visualization vs. visualisation.

When referring to completed work either singular ("I", "my") or plural form ("we", "our") can be used, but this should remain consistent throughout the document.

Tenses Do not switch between tenses. I recommend to stick to present tense (even for related work). If using past tense cannot be avoided for some reason, make sure that it is consistent within the respective paragraph.

[1] Disclaimer: the outlined points reflect both established best-practices and (in some cases) my personal preferences and recommendations. As the latter are subjective, feel free to respectfully disagree.

[2] Footnotes should generally be avoided in scientific writing.

Stringency Avoid using conjunctive forms such as "may", "might", "could", "should", but use self-assured formulations such as "My solution demonstrates/supports xy". Also, avoid imprecise quantifications such as "somewhat", or "a little".

Informality Do not use informal language such as "it's" or "they're".

Examples

✖ It's, they're, can't.	✔ It is, they are, cannot.

④ **Captions** Captions should be full sentences and end with a dot. They should fully describe the respective figure/table such that the element can be understood without the floating text. For tables, listings, and algorithms the caption should be on top.

Pro Tip

If a list of figures, list of tables is printed, a short version of the caption can also be provided as optional parameter `\caption[short caption]{full caption}`, which is used there.

⑤ **Equations** Equations are part of a sentence, even if they are written in "display" math mode. When referencing an equation, `\eqnref` must be used (renders the number in brackets).

Examples

✖ We define y in Eqn. (1).

$$y = x + k \tag{1}$$

✔ We define y as

$$y = x + k, \tag{2}$$

where x is [...]

✔ We define $y = x + k$, where x is [...]

Pro Tip

When an equation is never referenced in the text, the auto numbering can suppressed by using the '*' versions of the respective environments. I.e., `\equation*`, `\align*`, ...

⑥ **References** When referring to a concrete figure, table, equation (e.g., see Figure 1), use uppercase Figure, Table, Equation (or Fig., Tab., Eqn.). Use a non-breaking space (NBS) `~` to avoid line breaks between the label and the reference number. Do not use merely numbers as reference.

Examples

✖ as shown in 2.	✔ as shown in Fig. 2.
✖ as in figure 1	✔ as in Figure 1
✖ see Eqn. 3.	✔ see Eqn. (3).

⑦ **Citations** Citations must be part of the sentence – i.e., if the citation if removed the sentence should still be valid. When the citation is used as a noun, write the author name(s) followed by the corresponding `\cite`. If the cited item has one or two authors write their last names, followed by the corresponding `\cite`. In case of more authors the last name of the first author followed by "et al." is used. If multiple citations are used together, put them in a single `\cite`. If the authors' are referred to by name, the `\cite` should be directly after, otherwise it can be at the end of the sentence/paragraph.

If multiple consecutive sentences rely on information from a specific source, it is sufficient to cite it once, either at the start or the end of this sequence.

Examples

✖ Statement from reference. [1]	✔ Statement from reference [1].
✖ As shown by [1], we can [...]	✔ As shown by Someone et al. [1], we can [...]
✖ As presented by Pop, Asheton, and Alexander [1] [...].	✔ As presented by Pop et al. [1] [...]
✖ Various Statements [1][3][4][5][7].	✔ Various Statements [1,3-5,7].

Pro Tip

Some items take up comprehensive space in the references list. Even though it is essential that a reference contains all relevant items, there a several legit ways to reduce their extent:

- If a publication has more than 5 authors the list of names can be shortened with "et al.". With `biblatex` this can be governed through setting `maxbibnames`.
- Editors can be omitted for technical papers.
- If possible provide a DOI. Many applications which generate entries, generate URLs alongside the DOIs, which is then just the DOI prefixed with `https://doi.org/`. In cases where a DOI exists, this URL can be omitted.

⑧ **Enumerations/Bullet Lists** In English bullet points start with an uppercase letter. The should form a valid sentence – i.e., with a comma after each point and a dot at the end.

Good Practices and Tips

Besides the above errors/bad practices, I have the following tipcs for writing scientific documents, which are not mandatory per se, yet I still recommend to adhere to

Hierarchical Sectioning I often see that that different levels of hierarchical sectioning follow each other without any running text in between – e.g., Section 2.1. is directly followed by Section 2.1.1. This should be avoided. If there is nothing else to say, this space can be used to structure the following 'subparts'. Each node should have more than one node. E.g., if you have Section 2.1., 2.1.1., and 2.2., consider integrating 2.1.1. into 2.1.

Examples

✖ **2.1. Section on Something**
2.1.1. Section on Something Specific

✔ **2.1. Section on Something**
In the following, Section 2.1.1. elaborates on something specific, while [...]
2.1.1. Section on Something Specific

File Compression For visualization topics in particular, it is common to have several high resolution images, which can blow up the file size of the resulting PDF substantially. To reduce their size to a reasonable amount, I employ the POstScript-to-PDF converter `ps2pdf` to reduce figures a maximum resolution (DPI). Specifically, I use the following options: `ps2pdf -dCompatibilityLevel=1.4 -dAutoFilterColorImages=false -dAutoFilterGrayImages=false -dColorImageFilter=/FlateEncode -dGrayImageFilter=/FlateEncode -dGrayImageResolution=300 -dColorImageResolution=300 -dDownsampleGrayImages=true -dDownsampleColorImages=true input.[e]ps output.pdf`.

Optimal Usage of Space This applies more for paper writing than for seminars or theses as there is usually a page limit. Nonetheless, I definitely recommend to make good use of the available space. This is particularly the case for figures. If a figure has a rather vertical shape or takes up just a fraction of the linewidth, consider merging it with another (close-by) figure, using subcaptions or side-by-side figures. Others should occupy the whole of the width – i.e., `width=\linewidth`.