

Tips and Tricks

How to write an essay, report, paper or thesis

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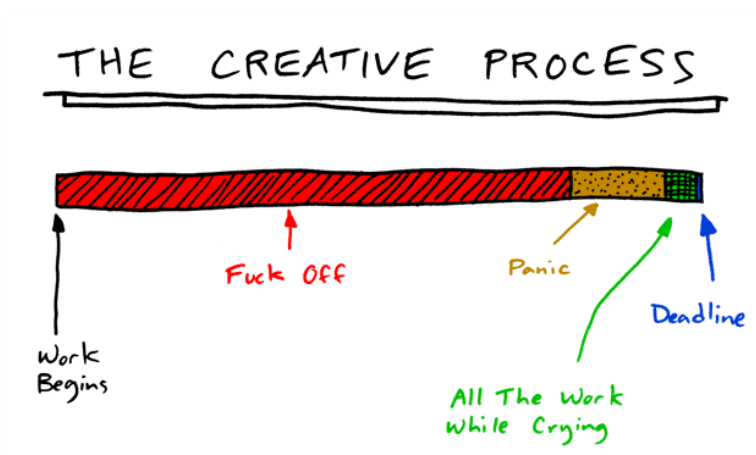
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Introduction – or the Minimum you should read from this Text

["Never give up – The beginning is always the hardest"]

You need to write a thesis, a project report or a scientific paper? You are asking yourself "How do I write a report"? These "Tips & Tricks" shall assist you during your writing process. I will not teach you "how" to write, and also these "Tips & Tricks" won't do so – it's you who will write it with the knowledge you gained so far during your high-school or academic career. Therefore, I am expecting that you know some details of scientific writing or the software that you are using – which means that you should be familiar with the basics of both already. Like a driver's license: you should know how to navigate your car, but there is no need to understand what's happening under the engine bonnet. I will present here – and I will restrict myself to – the most common errors or pitfalls that I encounter in students' or colleagues' thesis or manuscripts (something in the kind of "dos and don'ts" of writing essays if you prefer). If you want to know how to structure your writing or which content you need, you should consult some of the literature mentioned below. These "Tips & Tricks" are the result of copy-editing numerous student's essays, reviewing scientific papers in the past 30 years and being the managing editor of a scientific, SCI listed journal since 1989. You are not alone with your writing and what you are currently going through is what others – including me – went through as well. Yet, you will constantly progress and at the end you will know how to master your writing better than before. "Good writing is essentially rewriting," said the famous British novelist Roald Dahl. If, during reading those "Tips & Tricks", you will think at least once "Ah, that's how it is done" then I reached my goal.

From time-to-time students and colleagues tell me that only the content counts and not the format. Well, dear reader, if this were true, NASA would not have lost the space shuttle Colombia in 2003. Why that? One of the key slides in a Power Point presentation by Boeing to NASA officials had all the relevant information in the *content*, but because of the somehow confusing *format*, a wrong decision was made. Just two examples: in one single slide, the number and the unit in^3 were written in three different ways: "3cu. In", "1920cu in" and "3 cu in"; over and all, Boeing used the word significant or significantly four times without providing any information about the level or degree of significance. Finally, the relevant sentence was on the 3rd information level – let me repeat: a third level sentence that should have been the slide's title caused the loss of 7 people, millions of dollars and the end of NASA's space shuttle program. So, allow me to ask: are you still sure, format of a manuscript or presentation does not matter, if even highly paid decision makers are fooled by inconsistent writing and formatting? – I took this example from Tufte (2006).



Simplified sketch of the four phases of our creative process (modified from ToothPasteForDinner.com accessed 2010-10-30).

A lot of guidelines and books are available about scientific writing, and you should study a couple of them if you need to improve your writing skills. Writing is something you can learn, but only by doing so you will progress. In addition, even in the electronic world: have some reference books handy. I use two different printed thesauri and two dictionaries to ensure I use appropriate words. Moreover, of course, because English is not my first language, I always have a printed German-English dictionary somewhere near me and I am using DeepL (www.DeepL.com and www.DeepL.com/write) to help translating and improving my writing (see page 47). If you just want to know how to correct your text after you are finished, just skip the following chapters. Browse directly to the chapter 'Reports, Thesis and Scientific Papers', where you will find everything, you need to iron out the kinks in your text.

These "Tips & Tricks" are a complement to the excellent literature about scientific writing (e.g. Day and Sakaduski, 2011, Gastel and Day, 2022, Glasman-Deal, 2010, Strunk and White, 1999, The Economist, 2016). They do not necessarily mirror my own, personal preferences. Instead, these "Tips & Tricks" are based on standard books about copy editing and reviewing (e.g. Butcher et al., 2006, Hames, 2007, Messenger et al., 2007). What I intend to do here is to summarize the most common mistakes and writing errors that I find in my student's texts. Please allow yourself one to two hours time to read and understand the "Tips & Tricks". The best way is to make a short five second break after each paragraph and think where you used something described in the paragraph or where you might use it in the future. It is not advisable to read these "Tips & Tricks" as you would read a novel – it is more like a cookbook: the taste slowly adds up during the preparation of the meal. Before you go ahead, you should read at least the short 'cookbook' of Strunk and White (1999). Its first edition dates to 1919, but since then it kept its significance (I think I know what you might think now, when I use this word ...).

Part of those "Tips & Tricks" are from a compilation made for the Associate Editors of the journal "Mine Water and the Environment" and the "ASA-CSSA-SSSA Publications Handbook and Style Manual". The most current version of this writing guide is available by clicking this link: <http://bit.ly/WolkeSTipsTricks>. Most text examples are fictional but some of them are from published sources or student's reports without referring to them in all cases. You might consider that plagiarism – I would call it "protection of privacy" because not everybody likes his or her name to be associated with a bad example. Right?

Before I end: please read the manuals of all the software that you are using. Spend at least one to three full days to learn all the relevant functions of your tools. There are excellent tutorials on the web and excellent handbooks in the libraries of most universities. Study your software or attend a course

about its usage. Knowing your software makes writing your essay much easier for you and your supervisors (see chapter ‘Get your Software Driver’s Licence’ on page 12). Also, get to know the tools to draw and manipulate images, which I partly explain in the chapter ‘Figures’ (page 42).

And now – go ahead and good luck – in German miner’s terms: Glückauf!

“The first draft of anything is shit.”

Ernest Hemingway

The Quick Reference

If you don't have time to read the whole document ...

[... you can start here...]

I summarised the most common mistakes in manuscripts written for the IMWA proceedings. They are not in a specific order, just as they appeared to me when I thought of providing you a quick reference.

1. avoid the term “heavy metals”
2. avoid the word “significant” unless you did a statistical test
3. avoid the word “impact” unless for “environmental impact” or “meteorite impact”
4. avoid the term “decant” – the correct word is “discharge”
5. avoid the term “stratifugic water” – the correct word is “stratum water”
6. use a capital L for liter (litre)
7. there must always be a space between the number and unit
8. pH has no unit (never!)
9. the units ppm or ppb are not allowed anymore
10. these words must not be used in the plural: pyrite, sulfate, nitrate
11. write: sulfate not sulphate, sulfide not sulphide
12. write μS or μg or μL and not uS, ug or uL
13. it must be kg, kW, km, kJ
14. abbreviations for second, hour and year are s, h, a, and they have no plural
15. figures and legends must not have frames
16. there is no space between a number and % or ° (but it must be 12 °C, because °C is a unit)
17. make sure you write °C correctly
18. the symbol for “is similar” is \approx
19. do not use ~ when you want to express a range of numbers
20. et al. always must have a dot at the end
21. avoid “etc.” at the end of lists
22. the correct multiplication sign is \times
23. make sure you are always using the citation format requested by the publisher or conference organiser
24. convert all imperial units to SI units
25. always follow the manuscript instructions provided by the publishers or conference organiser

... and might want to understand ...

[... why I am writing that.]

Most of the above corrections are based on the recommendations of IUPAC and the SI association (Bureau International des Poids et Mesures, 2019). They are standard scientific notations. You might want to keep them in mind for *all* your future work.

And these are the explanations, which you can find explained in more detail in the following document:

1. According to IUPAC the term “heavy metals” must not be used anymore, as it has 40 different definitions and therefore is scientifically unclear. See: DUFFUS, J.H. 2002. “Heavy Metals” – A meaningless term? *Pure Appl. Chem.*, 74(5):793–807, doi:10.1351/pac200274050793.
2. Avoid the term “significant” unless you conducted a statistical test. Use “substantial” or “relevant” for example or any other suitable expression.
3. Avoid the term “impact” please. Only use it for “meteorite impacts” and “environmental impact” – no other use is recommended. Use “influence” or “effects” for example.
4. Decant is an active process by which a liquid from one container is decanted into another container. Mine water flows out passively, therefore it is discharging and not decanting.
5. *Stratum* water is water flowing within the strata, whilst *stratifugic* water are metal enriched deep fluids that evolve during diagenesis from the compaction of metal enriched sediments and subsequently form ore deposits such as the Mississippi Valley Type deposits (Bethke, 1986).
6. The abbreviation for litre is a capital L, not a small l or an ℓ (the latter commonly used in South Africa). Consequently, g/l and mg/l or g/ℓ and mg/ℓ must be corrected to g/L and mg/L or, alternatively, g L⁻¹ or mg L⁻¹ (this follows a 1979 recommendation of the CGPM – Conférence générale des poids et mesures)
7. There must always be a space between the number and unit (Bureau International des Poids et Mesures, 2019)
8. pH has no unit, as it is a logarithm and logarithms have no unit. It even hasn't the unit “s.u.” (‘standard unit’, ‘sine unitas’) – what you can or should write in tables or figures might be “–” where the unit should be.
9. Instead of ppm, ppb or ppt for liquids use mg/L, µg/L or ng/L. The Bureau International des Poids et Mesures (2019) recommends that “the terms ppb and ppt are best avoided” because “their meanings are language dependent” and therefore confusing. In addition, when used for water it is not clear if the “parts per” relates to the mass or the volume of the water. ISO 31-0 recommends avoiding the terms ppm, ppb and ppt at all. Therefore, it is recommended not to use any “part per” units for water.
10. There are simply no pyrites, and no sulfates or nitrates in water.
11. IUPAC requests to use sulfate not sulphate or sulfide not sulphide (doi:10.1351/goldbook)
12. Write µS or µg or µL and not uS, ug or uL (Bureau International des Poids et Mesures, 2019)
13. The prefix for the kilo is a small k, not a capital one: km, not Km or KM and kg and not Kg or KG. Yet, the prefix mega is a capital M: ML (megalitre) and mL (millilitre) are not the same! The capital K is used for the unit Kelvin (Bureau International des Poids et Mesures, 2019).
14. Use SI units without exception and do not explain them in the text. Second, minute, hour, day and year are written s, min, h, d, a respectively. All units, except for the L for litre and the units derived from the names of persons (e.g. S, Pa, V, A), are written in lowercase letters.
15. Nearly all journals require figures without frames. If frames are needed, the journal will add them for you.
16. The symbols %, ‰ or °, when used by itself, are no units and therefore directly follow the number: the acid's concentration is 10%, the dip angle is 34°, the δ¹⁸O was –3.1‰
17. Use the correct symbol for degrees, which is the shortcut key ALT + 0176 (°); avoid the shortcut key ALT + 0186 (º) or any other symbol such as a small o or a 0 in superscript.

18. The symbol for “is similar to” is not the \sim symbol, but \approx , which you can find in MS Word by going to “Insert” > “Symbol”. Symbols that you use often are saved by Word and show up when you use “Insert” > “Symbol”¹.
19. The symbol \sim is reserved for “is proportional to”. When you want to express a range of numbers use “–” or “...”.
20. When a paper has been written by more than two authors, you usually name only the first one and then you write et al. which, depending on the gender of the authors, means *et alia*, *et aliae* or *et alii* (and others) and therefore the *al.* has a period at the end. Please don’t write ‘et. al’ or ‘et. al.’ or ‘et al’.
21. Avoid “etc.” (*et cetera*) at the end of lists but start your list with “e.g.” (*exempli gratia*) instead or rewrite the sentence (in the first case the reader might think the author failed to have more ideas and in the second case the reader assumes the author thoroughly thought about his list and selected the most important items).
22. The correct multiply sign is \times (shortcut key ALT + 0215), not the letter x or the symbol *; in equations you can also use \cdot but not the \bullet , because it stands for “radicals” or “operator”
23. Make sure you are always using the citation format requested by the publisher or conference organiser
24. Convert all imperial units to SI units: the flow was 12.4 USgpm (47 L/min).
25. Always follow the manuscript instructions provided by the publishers or conference organiser

“So, okay. There you are in your room with the shade down and the door shut and the plug pulled out of the base of the telephone. You’ve blown up your TV and committed yourself to a thousand words a day, come hell or high water. Now comes the big question: What are you going to write about? And the equally big answer: Anything you damn well want.”

Stephen King

General Hints

First Write then Edit and Format

[*Rem tene, verba sequuntur*]

Sometimes students ask me how to proceed when writing: well, first write, then edit and format your text. Start with a table of contents and thereafter put down your ideas in the related sections. This text here started with four pages of an unsorted list of hints for students as a first idea and draft. The more input I received from my students and colleagues or during reviewing manuscripts, the more ideas I got and collected them for you.

If you have an idea for another chapter you are currently writing on, type in a double hash tag ##² where you stop, jump to the section for which you have an idea, and type in the idea within hash tags again, ##just like that## (for the use of hash tags, see page 39). Alternatively, use the comment functions provided by your word processor and type in your ideas in the comments fields (ALT+CTRL+M when you have an English or French version of MS Word, ALT+CTRL+K in a German one). Then jump back to where you left your text. Keep writing as long as you have the ideas in your mind. Don't care about grammar or spelling mistakes at this stage (even when the red or blue zickzag lines in MS Word show up, which indicate errors), while you put down your ideas – let the ideas flow as long and possible. Only when you want to make a short relaxing break, you go back to the text and correct grammar and spelling.

But; please edit and format your text before you hand it over to the publisher or your supervisor. Don't let him, her or them do **your** work as wrongly formatted and written texts distracts many supervisors from your scientific intentions.

Your Expectations and Disappointment

[*think positive – nearly all work grows between the two endpoints expectation and disappointment*]

At the beginning of your work you are expecting to proceed quickly, you are generally enthusiastic and energy laden about your project. This first phase is usually very productive; you collect information, read books or papers, speak to colleagues or conduct some lab experiments. Then, you might progressively encounter that you don't know enough about your subject and others did so much more. You will start to ask yourself what is new in the field and how you can contribute to the knowledge. Very often, you get disappointed and would prefer to skip your project. Yet, this is a normal process, and even during writing these 'Tips & Tricks' I sometimes thought if the effort I spend is worth the result (otherwise you wouldn't be able to read this text now). It is worth the result – and it is the usual "Creative Process", as you can see in the figure on page 4.

When you have the feeling that your thesis or project is not going ahead as you are expecting, take a big breath and lean back for a second or two. You might panic and don't see how to further progress. This is the time to take a walk, go into the cinema, read a non-scientific book, visit friends, listen to a presentation outside the field of your project – or just relax. Your brain will go ahead working and puts together missing information that you will need for the next phase of your project. Many ideas are coming at the most unexpected situations³ – try to seek for them!

After that break, you will notice that you have a lot of energy again and your ideas and figures and your text are developing quickly. Your disappointment will disappear the more you write and think and read and bring your thoughts and concepts to paper. Have somebody read your text from time to time and ask for comments.

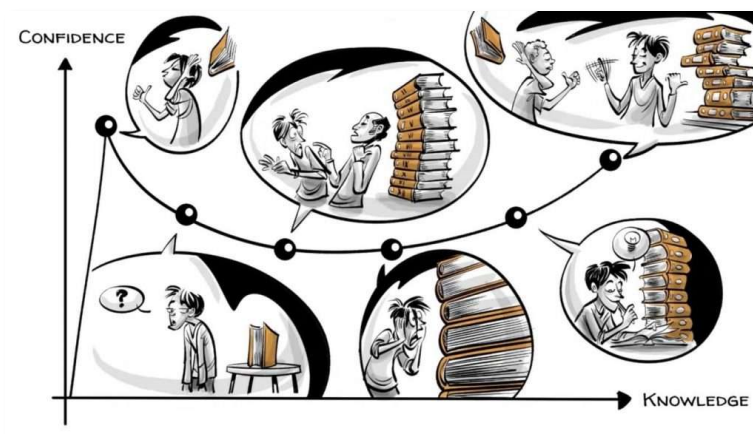
Therefore: never give up! You have more capabilities than you might expect, and the more you work the more you will see how your capabilities grow. And then, at the end of your projects' track, you will have that good feeling when you hold your product or paper or book or thesis the first time in your hands. Don't miss this great feeling! It is very energizing for your future career.

Unskilled and unaware of it – The Dunning-Kruger-Effect

[How Difficulties in Recognizing One's Own Incompetence Lead to Inflated Self-Assessments]

Often, when you interact with people, you will notice that there is someone in the group who thinks they know more than you do. This person will confidently discuss their knowledge of a particular subject in all detail. Yet, you, an expert in geology, mine water hydrology, butterflies or organocatalysis⁴, will remain silent because you know that this person has considerable knowledge gaps. In other words (from *sprouts*): "The Dunning Kruger Effect is a cognitive bias that makes people believe they are smarter and more capable than they actually are. The effect is related to people's general inaptitude to recognize their lack of ability". Professor Dunning's PhD student Justin Kruger investigated this effect experimentally and found that people with only a basic knowledge of a subject overestimate their confidence in that subject, while people with very good knowledge tend to underestimate their confidence (Kruger and Dunning, 1999). Fortunately, as knowledge increases, people recognise their previous lack of understanding and gradually improve.

By now, you may think that you already know a lot about writing, formatting texts and conducting literature reviews. In fact, you may have heard a lot about it at school or during the first few semesters of your studies. But these tips and tricks will help you to develop your knowledge in the direction of the diagram below. By doing so, your confidence will first decrease and by the time you are done reading and studying, your confidence will be based on real knowledge. I hope you will enjoy this journey, although there may be times when you will feel a little frustrated (image from *sprouts*). Just don't give up! You will very likely write your whole live (not as much as the Grimm brothers, but hopefully quite close to that) and learning to do so will make it easy for you.



Avoid Plagiarism – Never “copy-and-paste”!

[only good work is plagiarised – make sure you know how to do it if you intend to do so]

No matter where you found it: in a book, a paper or in the internet – Never copy and paste text from other publications without rewriting the text *and* properly referencing the source. Without rewriting or proper quotations, this is plagiarism, against the ethics of good science and includes your own published work (called self-plagiarism). If you are not H.G. Wells⁵, this plagiarism might result in severe consequences for you – including suspension from the university. You must refer to everything

you are using from other publications or reports *and* rewrite it in your own words. In addition, in natural sciences, you should avoid quoting more than one or two sentences. Should you need to refer to such a shorter passage of text word by word, you correctly need to use quotation marks as in the above quote from Hemingway or in the following one. Should you be unsure about the meaning of plagiarism, visit <http://bit.ly/PreventPlagiarism>. In any case, before you submit your essay, use a plagiarism detection tool such as Turnitin, iThenticate or SafeAssign.

Let me give you an example. The original text in the publication of Geldenhuis and Bell (1998) reads like that:

“This has led to a deterioration in the water quality in many surface streams.”

Here are four examples of plagiarism (red background) and four correct references (green background). The red examples are considered plagiarised as they meet the plagiarism criteria of the COPE (Committee on Publication Ethics: www.publicationethics.org) group:

“This has led to a deterioration in the water quality in many surface streams.” – reference missing

This has led to a deterioration in the water quality in many surface streams. – no quotation marks and reference missing

This has led to a deterioration in the water quality in many surface streams (Geldenhuis & Bell, 1998). – no quotation marks

This resulted in a general water quality deterioration in surface streams (Geldenhuis & Bell, 1998). – sentence slightly modified but clearly the same structure as the original

“This has led to a deterioration in the water quality in many surface streams” (Geldenhuis & Bell, 1998).

According to Geldenhuis & Bell (1998), “[this] has led to a deterioration in the water quality in many surface streams”.

Geldenhuis & Bell (1998) noticed that the water quality in surface watercourses substantially declined.

The quality of watercourses worsened because of these influences (Geldenhuis & Bell, 1998).

Some people think that it is acceptable when you refer to a publication and copy and paste text from that publication. Yet, this is not the case. Very often, I see proposals or essays that are completely composed of copied and pasted text from other work with correct references – but still: copy and paste is plagiarism; no matter if you provide a correct reference or not (see the third example in the above texts)! You are not allowed to copy and paste *any* sections from other works. To make it simple (and to repeat): copying and pasting from other works is forbidden under all circumstances! This also refers to figures or tables.

Backups

[you don’t need it? Wait until a virus corrupted your complete hard disc – then you wished you had!]

When you write your text, save it with a new name immediately after you open the document (file) to proceed with your writing. This ensures that you always have an uncorrupted version of your text in case of a computer failure:

Day 1: My_Proposal_000.docx or My_Proposal_2019-02-28.docx

Day 2: My_Proposal_002.docx or My_Proposal_2019-02-28.docx

...

Day 99: My_Proposal_099.docx or My_Proposal_2019-07-12.docx

Back up your documents regularly to an external hard drive or USB flash drive⁶. Alternatively, use cloud services (e.g. Dropbox, SkyDrive, OneDrive) to keep your documents backed up and available at all times.

Saving your valuable Documents (“Files”)

[do you have an idea how many files I have on my computer named **proposal.docx**?]

Always save your documents with a “speaking” filename that contains your name, the topic and a running number or date. This is especially helpful when you get a template – do not save your document under the name of the template. You will confuse your reader and supervisors.

Proposal Template.docx

Sibelius_MSc_Proposal.docx

MyThesis_CW_2015-06-28.doc

You should also restrict yourself to letters, numbers, spaces, underscores and hyphens for file names. All other characters (especially dots or commas) might either cause confusion on some systems or are completely forbidden on MS Windows systems (i.e. * ? < > / \ : | ")

MyBook_PopePeter_2019.12.12.doc

Einstein_Rivers_1926/01/20.doc

In addition, you should never use capital letters in your file names. Not only does it look ugly, it also consumes more space and you can’t always see the full name of the file in the file explorer.

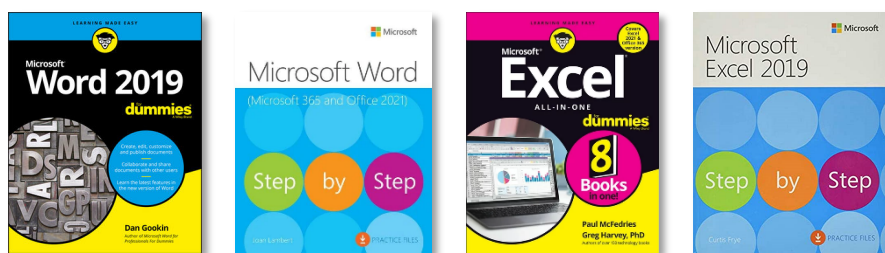
CHRISTIANS_FIRST_FILE.xlsx

Christians_First_File.docx

Get your Software Driver’s Licence

[you don’t drive car without a professional guidance – why are you doing it with your software?]

Read the manuals of your software. They are available online or in most university libraries. In addition, consult the help files of the software or follow an on-line tutorial. Before you drive a car, you also must get a driver’s licence – the same is true for software. You should read a good manual so that you know what the software is capable to do – the yellow “... for Dummies” series of books might be a good and affordable starting point (e.g. Gookin, 2016). The MS Office series of products is a mighty tool, and you will not understand all its options by just sitting in front of your computer and trying to use the software. Only a good manual or tutorial can introduce you to the functions you need to make writing a thesis as easy as possible.



Cover images from the Microsoft Press and For Dummies® web sites.

You also need to read a manual about your literature management software. Typing in the information wrongly will result in awkward reference lists. Please do not use a text file or a spreadsheet to organise your literature. Always use a literature management tool and when you are not too sure of how to format your references in case you do not have a software – there are many web pages that help you to format your references properly (yet, when you have more than 10 or 20 references, this becomes a little bit cumbersome).

The final Editing

[it's a good idea to ask a friend in this last step]

To find problems in your sentences, it often helps to read the text loudly. Very often, you encounter mistakes that you did not see on the screen. For sections that are more complicated it might also be helpful to write them down on paper first, and thereafter type them into your document. And, of course, you should not forget the help of your friends and colleagues. Give them your final version and ask them to go critically through the text and let you know whatever you should change. Do not let your supervisors do this job – they should be able to concentrate on your scientific content, not correcting typos, wrong references and awkward sentences.

Finally, when you present a printed copy of your essay to your supervisor, ensure (s)he is not able to identify if your last breakfast had tea or coffee and cake – please submit only paper that is not smudged with grease spots or the tips of your lovely cat.

References – The Ingredients of your text

Literature References – Some basics

[at least: be consistent!]

References are the key to proof that you know your subject. They tell your reader, reviewer or supervisor that you properly took into consideration the work of the colleagues in your area of research. Without reading and properly citing your references, you would be like a hermit who does not know what's going on around him or her. Consequently, for your work, references are similar essential then your genuine research data. I am, therefore, somehow astonished how stepmotherly a lot of reference lists in manuscripts and thesis drafts are coming along. Many people are not taking properly care of their references and they are very often messed up in many ways.

One of the key tools to ensure consistency is using a literature management tool, which can be online (e.g. Mendeley, EndNote Web) or offline (e.g. EndNote). As already mentioned, you should use and read the manual about your literature management software. Typing in the information wrongly will result in awkward reference lists. Please do not use a text file, a spreadsheet or the build in function of MS Word to organise your literature. Do not copy and paste references simply from another publication or from the authors' list on the web page or the electronic file. You always need to retype your references and format them according to the necessary reference style. When you are not too sure of

how to format your references, visit one of the many web pages that help you to format your references properly.

When using references, make sure you use primary sources only. When an author A, for example, writes about subject 1, and author A refers to author B, you also must refer to author B – which implies, that you need to read the paper from author B. Let me give you an example:

Latvalahti (1979) – author A – writes on page 1036: “There are also small subeconomic apatite- and titanium-bearing iron occurrences in the zone (Wennervirta and Papunen, 1974 ...)” – author B. When you are referring to this information, you must not write

In the Leptite zone, small iron mineralisations containing apatite and titanium have been identified (Latvalahti, 1979).

Instead, you need to read Wennervirta and Papunen (1974) and correct the above sentence to

In the Leptite zone, small iron mineralisations containing apatite and titanium have been identified (Wennervirta and Papunen, 1974).

References – Styles

[at least: be consistent!]

Each research institution and journal has its own reference style guides, which might differ substantially, as you can see from the table below. Follow and read the Style Guide for your relevant university or for the journal in which you want to publish. In this chapter I will provide you with further information about the use of references in your text.

- Tshwane University of Technology (TUT): http://bit.ly/TUT_Citation_Guide
- Lappeenranta University of Technology (LUT): http://bit.ly/LUT_WritingAThesis
- Mine Water and the Environment: <http://www.MWEN.info/notes-for-contributors.html>

Nevertheless, whichever reference style you use: be consistent and avoid changing from one style to the other. Yet, when writing for a journal you must use the journal’s referencing format. Using a reference management software (*e.g.* EndNote, RefWorks, Citavi or Mendeley) helps you to change the format quickly, should you need to send your paper to another journal. Avoid using the build in function of MS Word, as it is very restricted with its output formats. In general, a reference consists of the following bibliographic elements: Authors(s) – Year of publication – Title of publication – Journal name – Volume(Issue) – Page numbers. Some journals require the publication place or the collation information (number of figures, tables and appendices), while others skip the Title of the publication.

The following table gives you an idea of the most commonly used and some journal reference styles – but there are several hundreds more of them in use.

Style	Example of Reference
APA 7 th	Wolkersdorfer, C., Nordstrom, D. K., Beckie, R., Cicerone, D. S., Elliot, T., Edraki, M., Valente, T. M., França, S. C. A., Kumar, P., Oyarzún Lucero, R. A., & Soler, A. I. G. (2020). Guidance for the Integrated Use of Hydrological, Geochemical, and Isotopic Tools in Mining Operations. <i>Mine Water Environ.</i> , 39(2), 204–228. https://doi.org/10.1007/s10230-020-00666-x
Bonn Guidelines	WOLKERSDORFER, C., NORDSTROM, D. K., BECKIE, R., CICERONE, D. S., ELLIOT, T., EDRAKI, M., VALENTE, T. M., FRANÇA, S. C. A., KUMAR, P., OYARZÚN LUCERO, R. A. & SOLER, A. I. G. (2020): Guidance for the Integrated Use of Hydrological, Geochemical, and Isotopic Tools in Mining Operations. – <i>Mine Water Environ.</i> , 39(2):204–228, 7 Abb., 2 Tab., 5 Anl.; doi:10.1007/s10230-020-00666-x.
Chicago 17 th	Wolkersdorfer, Christian, Darrell Kirk Nordstrom, Roger Beckie, Daniel Salvador Cicerone, Trevor Elliot, Mansour Edraki, Teresa Maria Valente, <i>et al.</i> “Guidance for the Integrated Use of Hydrological, Geochemical, and Isotopic Tools in Mining Operations.” <i>Mine Water Environ.</i> 39, no. 2 (2020): 204–28. https://doi.org/10.1007/s10230-020-00666-x .
Harvard	WOLKERSDORFER, C., NORDSTROM, D. K., BECKIE, R., CICERONE, D. S., ELLIOT, T., EDRAKI, M., VALENTE, T. M., FRANÇA, S. C. A., KUMAR, P., OYARZÚN LUCERO, R. A. & SOLER, A. I. G. 2020. Guidance for the Integrated Use of Hydrological, Geochemical, and Isotopic Tools in Mining Operations. <i>Mine Water Environ.</i> , 39, 204–228.
Mine Water Environ. (Springer Nature)	Wolkersdorfer C, Nordstrom DK, Beckie R, Cicerone DS, Elliot T, Edraki M, Valente TM, França SCA, Kumar P, Oyarzún Lucero RA, Soler AIG (2020) Guidance for the Integrated Use of Hydrological, Geochemical, and Isotopic Tools in Mining Operations. <i>Mine Water Environ</i> 39(2):204–228. https://doi.org/10.1007/s10230-020-00666-x
MLA 8 th	Wolkersdorfer, Christian <i>et al.</i> “Guidance for the Integrated Use of Hydrological, Geochemical, and Isotopic Tools in Mining Operations.” <i>Mine Water Environ.</i> , vol. 39, no. 2, 2020, pp. 204–228, doi:10.1007/s10230-020-00666-x.
RSC Advances	1. C. Wolkersdorfer, D. K. Nordstrom, R. Beckie, D. S. Cicerone, T. Elliot, M. Edraki, T. M. Valente, S. C. A. França, P. Kumar, R. A. Oyarzún Lucero and A. I. G. Soler, <i>Mine Water Environ.</i> , 2020, 39, 204–228.
Vancouver	1. Wolkersdorfer C, Nordstrom DK, Beckie R, Cicerone DS, Elliot T, Edraki M, <i>et al.</i> Guidance for the Integrated Use of Hydrological, Geochemical, and Isotopic Tools in Mining Operations. <i>Mine Water Environ.</i> 2020;39(2):204–28.

References – Foreign Titles

[The bits and bytes of referencing]

When you have references with titles in foreign language, you have two options to indicate that. One is simple but not that nice for your readers and the other one is slightly more work for you, but nicer for your readers. Because you are writing for your readers and not for you, let me start with the nicer version, which is also recommended by the APA Style guide (American Psychological Association, 2020):

DUROV, S.A. 1949. Треугольная форма графического выражения результатов водных анализов и применение ее к классификации природных вод [Triangular graphical expression of water analyses results and its application to the classification of natural waters]. Гидрохимические материалы [Hydrochemical Materials], 17:54–60.

EINSTEIN, A. 1926. Die Ursache der Mäanderbildung der Flußläufe und des sogenannten Baerschen Gesetzes [The cause of the formation of meanders in the courses of rivers and of the so-called Baer’s law]. *Naturwissenschaften*, 14(11):223–224.

Another version would be to use the paper’s English title and indicate in which language it was published. Yet, the disadvantage would be that your readers won’t be able to locate the publication because the title might not have been translated into English.

DUROV, S.A. 1949. Triangular graphical expression of water analyses results and its application to the classification of natural waters [in Russian]. *Hydrochemical Materials*, 17:54–60.

EINSTEIN, A. 1926. The cause of the formation of meanders in the courses of rivers and of the so-called Baer's law [in German]. *Naturwissenschaften*, 14(11):223–224.

Both versions are correct, but if you use a search engine and try to find these two articles, you will very likely fail to do so⁷.

Literature Review – How to find what others did

[the more you read the less time you will spend on duplicating already done experiments]

If you start writing your essay without a preceding literature review, it would be like walking through a dark tunnel without a torch or candle. In both cases you might, and very likely will, get lost. Obviously, your scientific work should start with reading articles and books about your subject. After you found the first published work about your subject, or that touches your subject, you can use the references in this work to go further. It is somehow like playing domino – once you hit the first stone, the others will fall automatically.

You should first find books about your subject and read the generally accepted methods and knowledge about your subject. Once you know the basics, you can then start to also read journal articles, as they usually cover aspects that are more detailed or have more recent findings. Most journal articles do not repeat the generally accepted knowledge; therefore, you might find it hard to understand your subject. There are excellent books about nearly all subjects you can consider – do not miss them.

Should you plan to start your literature review in front of your computer, open your browser and navigate to an internet search machine (such as Google, Bing, DuckDuckGo or Startpage) you should at once stop! This is the wrong way and leads you into the information nirvana. Using an internet search machine to help you in a literature review is simply a no-go (and this holds true for Google-Scholar). You need to start with your library's OPAC to find relevant books. From there you move to a literature search engine, and you should go ahead in this order: Web of Science ("Science Citation Index"), SciFinder, GEOREF, Sciencedirect, Springerlink. Only – and really only – when you already know a paper's title you might use an internet search engine to be able to retrieve the full reference of the article or to download it. You can find a helpful list of academic databases and search engines when you follow this link: <http://bit.ly/DatabaseList>

Here is a list of non-crawling-based databases (📖) and literature repositories (📄) that you should use:

- 📖 Web of Science: WebOfKnowledge.com (Clarivate 'Science Citation Index')
- 📖 Proquest: www.Proquest.com
- 📖 SciFinder: SciFinder.cas.org (CAS, Chemical Abstracts Service)
- 📖 EBSCOhost: www.EBSCOhost.com
- 📖 GeoRef: www.americangeosciences.org/georef
- 📄 ScienceDirect: www.sciencedirect.com (Elsevier)
- 📄 SpringerLink: link.springer.com (Springer)
- 📄 TandFOne: www.tandfonline.com (Taylor & Francis)
- 📄 ACS Publications: pubs.acs.org (American Chemical Society)

Nowadays, nearly all published work is also available online for download. Yet, this does not mean that you refer to this article through the web page, where you downloaded it. You always need to refer to a published paper the way described in the previous chapter (see page 32 for an example). There is also no need to supply the "accessed at" tag when you cite a published paper.

Reports, Thesis and Scientific Papers

Introduction

[a long list – you should learn it by heart for your future career and for your current work]

The following bullet points list common errors and mistakes that I commonly find in written work by students or authors of papers in various countries. **PLEASE READ ALL OF THEM CAREFULLY AND CONSIDER THEM IN YOUR TEXT.** There is no specific order within the following subsections – except the one that was in my head while I compiled it for you. According to your opinion, some bullet points might belong to another sub-section – well it's like eating chocolate: some people like 100 % cacao, others prefer white chocolate; it's a matter of flavour, I would say.

You should give yourself several seconds of break after each bullet point and rethink the meaning of the bullet point. Give yourself at least one to two hours' time to understand this document.

Using your word processor

- Learn how to use your word processor – it is a Mercedes Benz – there is no need to drive it in the first gear with 30 km/h only! (more information: <http://bit.ly/WordForDissertations> or <http://bit.ly/HowToUseMSWord>)
- use the automatic numbering function of your word processor to number chapters, figures or tables – avoid numbering items manually (see above link for usage). When you use automatic numbering, you must also cross-reference to the automatically numbered items in your text, do not type in references to tables and figures manually! Yet, before you send your manuscript to a journal, ensure that you convert all your automatic numbering to fixed text.

To remove the automatic numbering in MS Word, mark all your text (CTRL+A) and then press CTRL+SHIFT+F9.

- Use the auto correction of your word processor and add unknown words to the word processor's dictionary.
- This paragraph might sound ridiculous to you but: don't use a spreadsheet for writing your essay⁸. Always use a word processor such as MS Word, OpenOffice, Latex, WordPerfect or even WordPad. If you want to submit your text to a scientific journal, make sure that they can handle your chosen file format. "Mine Water and the Environment" for example, accepts only MS Word and RTF-files ("Rich Text Format").

Content

- state the purpose of the report or paper on the title page (e.g. iMineWa annual report, MTech Project Proposal)
- Avoid writing text between the different heading levels.

2 Research Problem (heading level 1)

2.1 Introduction (heading level 2)

This investigation is based on the previous publication by Molongwana (2014) about the caves.

2.2 Hypothesis (heading level 2)

Other than Molongwana (2014) states, the water discharge is located below the street level.

3 Background *(heading level 1)*

This chapter describes the Background for the study. *((This sentence is WITHIN different heading levels))*

3.1 Project Description *(heading level 2)*

Earlier studies assumed that the cradle of humankind is the oldest known site with human remains.

3.2 Regional Geological Situation *(heading level 2)*

All the rocks within the study area are carbonate rocks of different composition (Pillay, 2014).

- Avoid writing conclusions, results or ideas in “bullet points” – it seems to become a bad habit, which needs to be stopped. Always use full sentences in your report or paper – unless you want to list some items; the main information, yet, must be given in full sentences.

The sub-problems in relation to the problem statement are:

1. Identify suitable injection points for the tracers to be injected

1.1. Identify suitable tracers

1.2. Calculate amount (kg) of tracers needed

2. Identify suitable sampling points

2.1. Sampling method

3. Analyses of data

3.1. Breakthrough curves of each tracer

3.2. Calculate contribution of each point

The sub-problems related to the problem statement are the identification of suitable injection points for the tracers to be injected, suitable sampling points and data analysis. This includes the identification of suitable tracers and their quantity, finding reliable sampling methods and the generation of individual breakthrough curves as well as the calculation of the contribution of each injection point to the result.

- Ensure that your sentences are not too long or too complicated. To make reading easier and more interesting, use variably long and short sentences with a best sentence length of 12 to 25 words. A paper is not only about science. When you use a boring writing style, your reader might simply stop reading it. This paragraph consists of sentences with 11, 23, 7, 14 and 13 words.
- Headings in the text are not part of the text. You cannot refer to a word or meaning in a heading.

Elephants

Those animals are very large, but it is nice to watch them when they are drinking.

Elephants

Elephants are large animals, which drink water by the help of their trunk. It is nice to watch them drinking in nature.

- Don't hit 'Enter' at the end of a line unless you want to start a new paragraph (and please, hit it **once** only). Your word processor takes care of line breaks by itself – you don't have to do that. That was back in some archaeological time when people still used typewriters (you might want to google that word if you don't understand it).

Words

- Avoid the term "Heavy Metal", as it has about 40 different definitions (Duffus, 2002) – except you are writing about music styles (Chapman, 2007). Please substitute it either by "Metals" or "Metals and Semi-Metals," or some other correct term. "toxic metals" is not a correct term, because a lot of them are essential for life or are not even metals, such as arsenic or antimony (more details there: <http://bit.ly/Duffus2002>). An expression that you might use is "elements of potential concern". A good reference for chemical terminology are the publications of the IUPAC (International Union of Pure and Applied Chemistry), especially their "Compendium of Chemical Terminology – Gold Book" (International Union of Pure and Applied Chemistry, 2014).

All heavy metals (Pb, Zn, Fe, As, Sb) were analysed by ICP-MS.

Table # Heavy metals in the ## constructed wetland

Site	Units	As	Ca	Cu	Fe	Pb	Li	Mg	Mn	Na	Zn
Inlet	µg/L	0.9	30000	10.0	180	1.4	2.0	5900	23	34000	78
Outlet	µg/L	0.8	18000	9.4	230	1.3	0.8	5200	18	26000	68

While she listened to the Heavy Metal album 'Now What?!', she compiled her paper about (semi)-metal removal from polluted mine water.

- Don't use the term 'sulphate' when you mean SO_4^{2-} . The 'Gold Book' (International Union of Pure and Applied Chemistry, 2014) clearly defines that it must be 'sulfate' in all English languages. Or, as Cantrill (2009) pointed out: „Language is our servant, not our master and it evolves to meet our needs. And in the case of sulfur, there seems to be no good reason to continue using the 'ph' form other than perhaps a mistaken sense of spelling jingoism.“
- Do not write that water contains "salts" – it contains "dissolved salts", but better is to speak about phases and species, as it's scientifically more correct. In some cases, you might want to write "mineralisation" instead.

Commonly, the water is laden with high metal and salt concentrations.

Commonly, the water has high metal concentrations and an elevated mineralisation.

- Be careful when writing about your results: an analysis doesn't show anything, only results show something. Compare to results in Figures on page 30.

The analysis show ...

The results show ...

The analytical results show ...

The results of the analysis show ...

- Avoid the term “mine drainage” but write “mine water” instead. Exception: Acid Mine Drainage (AMD), as this is a technical term. Feel free to write “Acid Mine Water” instead, but do not use the abbreviation AMW – this is not commonly accepted. You should also avoid the term “AMD water” as it is a pleonasm.
- The acronym “MIW” means *mining influenced water* and not mining impacted or mining impaired water. Do not use these two latter terms at all.
- Avoid the word “significant” unless you conducted a statistical investigation and proved that something is indeed “significant”. In all other cases write “substantial”, “considerable”, “relevant” or “noteworthy” – depending on the context

Pistorius (2013) showed that there is a significant likelihood of intruders in his environment.

Several electrical properties of rocks and minerals are significant in electrical prospecting.

Pistorius (2013) could not exclude a substantial number of intruders into his environment.

Pistorius' (2013) results show a statistically significant correlation between the number of intruders and valentine's day presents.

Several electrical properties of rocks and minerals are relevant in electrical prospecting.

- “Here” is where you write your paper, but “there” is where you took your samples. Understand the difference in the meaning of “here” and “there”.

All analysed springs in Limpopo Province are of questionable quality. Tekere et al. (2015) investigated the microbial community here.

Yet, Olivier (2011) could show that the water temperature there varies between 30 and 68 °C.

- Avoid abbreviations in headings, unless you explain them

7.4.3 NRM

7.4.3 NRM (Natural Remnant Magnetization)

- In the time of computers, the extensive use of abbreviations it is no longer necessary, especially when you use it seldom in your text. You can write words like “Laboratory of Green Chemistry” or “Mine Water Treatment Plant” whenever it appears instead of writing LGC or MWTP – make it as easy as possible for your readership. Exceptions are AMD or ARD, because these terms are commonly accepted and known in our community. But be careful with ALD – do you mean “atomic layer deposition” or “anoxic limestone drain”?
- Introduce abbreviations when they first appear (but not in the abstract). Once you have introduced an abbreviation, it is no longer necessary to write the expression and abbreviation repeatedly in later sections of your essay. Do not list chemical formulae (e.g. Na, NO₃⁻, H, Se) or units (e.g. m, mL, kg) in your list of abbreviations.

pH values at IMC were too low to be measured with a normal pH-meter.

Under cross polarized light (XPL) the first mineral showed a greyish colour, and the second one showed a reddish colour under cross polarized light (XPL).

SO₄²⁻ sulfate

pH values at Iron Mountain in California (IMC) were too low to be measured instantly.

pH values at IMC (Iron Mountain in California) were too low to be measured instantly.

Under cross polarized light (XPL) the first mineral showed a greyish colour, and the second one showed a reddish colour under XPL.

- avoid one sentence paragraphs. Each paragraph must consist of at least two sentences.
- avoid “*etc.*” (*et cetera*) at the end of lists but start your list with “*e.g.*” (*exempli gratia*) instead or rewrite the sentence (in the first case the reader might think the author failed to have more ideas and in the second case the reader assumes the author thoroughly thought about the list and selected the most important items). Examples are from Pošepný (1902) and Meinzer (1923).

It may be inferred that metamorphous or metasomatic deposits will be especially frequent in soluble rocks like limestone, dolomite, *etc.*

It may be inferred that metamorphous or metasomatic deposits will be especially frequent in soluble rocks such as limestone or dolomite.

Abrasion methods (diamond, calyx, chilled-shot, *etc.*)

Abrasion methods (*e.g.* diamond, calyx, chilled-shot)

- Distinguish between *affect* (to influence) and *effect* (result or to accomplish)

The effects of inflation do not affect me!

The Corona Virus didn't affect me as I didn't show any effects.

- Distinguish between *accept* (to receive) and *except* (to leave out)
- Distinguish between *allusion* (an indirect reference) and *illusion* (a false perception)
- Distinguish between *its* (possessive form of “it”) and *it's* (contraction of “it is”)
- Distinguish between *their* (possessive form of “they”), *there* (indication of location) and *they're* (contraction of “they are”)
- Distinguish between *then* (next or at that time) and *than* (used in comparisons)
- Distinguish between *to* (toward), *too* (also or excessively) and *two* (number)
- Distinguish between *your* (possessive form of “you”) and *you're* (contraction of “you are”)
- Distinguish between *any more* (for counting) and *anymore* (time related)

He couldn't analyse any more samples at this location, as the water was not flowing anymore.

- When you speak about water constituents, use the terms ‘sulfate’, ‘nitrate’ and ‘phosphate’ only in its singular form. There are also no ‘pyrites’ that might cause acid mine drainage – it is just one ‘pyrite’. In addition, when you analyse a water sample, it has no ‘sulfates’ or ‘nitrates’ of ‘phosphates’ concentrations.

The concentration of sulfates in the water sample was 1428 mg/L.

Pyrite oxidation is the starting point in the formation of acid mine drainage.

- Avoid the term “impact”, which means a collision, the force of a collision or (by extension) a major effect. You can use this term when you are speaking about a meteorite impact (this is a technical term), an environmental impact (which is also a technical term) or wave impact (another technical term – but consider using “wave action” instead). Use “effect” or “consequence”, “implication” or “influence” instead – depending on the context.

The acid mine water had a negative impact on the stream water quality.

Obviously, this book impacted the thinking of modern man.

The acid mine water had a negative effect on the stream water quality.

Vredefort Dome World Heritage Site is one of the largest visible impact structures on Earth.

None of the earlier environmental impacts can be observed today.

Due to the wave impact the mineral sands on Fraser Island were quickly eroded.

As a result of wave action, Fraser Island’s mineral sands are constantly eroding.

- Avoid writing about the “content” or “value” of constituents. The correct expression is “concentration”. In addition, you can write “below” instead of “was lower than”

High Ca^{2+} and Mg^{2+} contents were observed in the samples.

The value of sulfate was lower than 500 mg/L.

High Ca^{2+} and Mg^{2+} concentrations were observed in the samples.

The concentration of sulfate was below 500 mg/L.

- Try to avoid the article “the” at the beginning of sentences. It is considered bad writing. There are many possibilities to rewrite your sentences without using the article at the beginning. Interestingly enough, the less articles you use at the beginning of sentences, the better your text can be read and understood (examples in this guideline use sometimes articles at the beginning because they are cited without the whole context).

The most cited mercury poisoning occurred in Japan in 1956, where effluents containing mercury were discharged into the Minamata Bay. The methylmercury formed by the conversion of elemental mercury by microorganisms was taken up by fish.

In 1956, the most cited mercury poisoning occurred in Japan, where effluents containing mercury were discharged into the Minamata Bay. Extensive investigations showed that the methylmercury formed by the conversion of elemental mercury by microorganisms was taken up by fish.

To overcome the problem of articles at the beginning of sentences, you need to use transitional words and phrases (<https://yoast.com/transition-words-why-and-how-to-use-them>). They are, as Patricia Campbell pointed out, “the traffic signals in writing”. Transitional expressions ensure that you link sentences and ideas. Using transitional expressions, you could rewrite the two above sentences like that:

For instance, the most cited mercury poisoning occurred in Japan in 1956, where effluents containing mercury were discharged into the Minamata Bay. As a result of extensive investigations, it could be shown that the methylmercury formed by the conversion of elemental mercury by microorganisms was taken up by fish.

- “geology”, “hydrogeology” or “geohydrology” are sciences. If you want to describe the geological, hydrogeological or geohydrological situation, please write as follows:

Govender (1983) provided a detailed description of the geological characteristics.

‘Geohydrology’ is the term commonly used in South Africa for what is ‘hydrogeology’ in other parts of the world.

The geology is characterized by ignimbrites.

Virtanen’s (1883) description of the hydrogeology in Finland is outdated.

- Ensure that you do not use a 0 (number zero) when you want to use an O (letter O).

H₂O has a different molar mass than H₂SO₄

H₂O and H₂SO₄ are both liquids under standard conditions

- Do not use the term “decant” for a mine water discharge. The correct term is “discharge”, or when used as a verb, you can also use “to emanate”. The verb ‘to decant’ is used for an active process, but seldom, a mine is discharging ‘actively’, therefore using the word ‘decant’ in the before mentioned cases is incorrect.

The mine water discharged from the abandoned shaft.

The mine water emanated from the abandoned shaft.

No measurements were possible at the discharge location.

Mine water at the Fanie Nel Discharge has a pH of 3.81.

All the decants were analysed.

There are concerns that include the decanting of contaminated mine waters.

- Do not use the expression “stratifugic water” when you mean “stratum water” or “strata water”. *Stratum* water is water flowing within the strata, whilst *stratifugic* water are metal enriched deep fluids that evolve during diagenesis from the compaction of metal enriched sediments and subsequently form ore deposits such as the Mississippi Valley Type deposits (Bethke, 1986).
- Do not simply write “opencast” when you mean an “opencast mine”. Different from this British English term, the US English uses “open pit mine” or “surface mine”.

Sulfate concentrations from opencasts are usually high.

Sulfate concentrations from opencast mines are usually high.

Sulfate concentrations from open pit mines are usually high.

Sulfate concentrations from surface mines are usually high.

- Avoid using the expression “something is facing” or “something faces a”. As much as it’s not wrong, it is not a very English expression and not very scientific. It is better to write “is confronted with”, “encounters” or “is challenged”.

Johannesburg is facing a major crisis.

The mine planner faces a number of obstacles.

Johannesburg is confronted with a major crisis.

Johannesburg is at the threshold of a major crisis.

The mine planner is challenged with several obstacles.

The mine planner encounters several obstacles.

- Avoid repeating a number in the text in brackets. This might be helpful for a lawyer who is paid by the number of words in a contract, but not in scientific writing — unless you write an essay about legislation, where it might be required.

The report listed six (6) recommendations to address AMD.

The report listed six recommendations to address AMD.

Punctuation

Undoubtedly, the purpose of punctuation is to clarify the syntax of your text. You are not the famous author Johann Wolfgang von Goethe, who often used syntax to express the lengths of breaks between words; therefore, you need to know the rules of syntax (some people call punctuation the traffic signals of language, indicating when we shall stop, detour, slow down or speed up). As in the earlier sections, I list the most common errors I encounter in students’ reports and papers. Keep them in mind when writing your essay! Yet, if you want to know more about punctuation, you should read the excellent and refreshingly written book by Lynne Truss (2003): “Eats, Shoots & Leaves – The Zero Tolerance Approach to Punctuation”, from which I benefitted a lot.

- Use decimal point instead of decimal comma for international papers

Flow at the stream was 12.4 L/s

and the electrical conductivity between 0,234 and 0,312 mS/cm.

When writing official documents for the European Union (EU) you should use a decimal comma also for English text. The EU parliament, representing more than a Dozen of languages, decided to simplify the rules and therefore official EU documents use the decimal comma instead. A similar, but not commonly followed recommendation exists for South African English.

The income in the European Union increased by 3,4 % to 2.472,32 Euros.

- Learn to distinguish between hyphens and dashes. Hyphens are used within words and dashes in the sentence and for numbers. Instead of the long dash between numbers, it is recommended to use the ‘...’ symbol, called ellipsis, which avoids having a dash and a minus sign following each other.

Hyphen: “this is his so-called friend”

Dashes: “the water source – which also acts as drinking water – is usually of good quality”

Dashes: “the length of the pipe is 5 – 10 m”

Ellipsis: “In winter, the lowest temperatures ranged from –12 ... –4 °C.”

- Use the correct *optional hyphen* when you need to hyphenate a word by pressing CTRL+HYPHEN. Do not manually type in a hyphen ('-'). You can identify wrong hyphenation when you find words **hyphen-ated** in the middle of a line. With the optional **hy-phen** (which you can see when you press the *nonprinting characters* symbol ¶ or hit CTRL+SHIFT+8 in MS Word), this will not happen, as Word uses the hyphenation only when needed at the end of a line.
- Don't use “:” or “.” after headings

Metal Concentrations

Metal concentrations in the water exceeded the national limits at all locations.

Quaternary Deposits:

A large number of rivers characterizes the study area.

Temperature.

All temperature measurements were done during daytime.

- Use the correct quotation marks. In English, it looks like that “...” and not like this “...”. Do not use two apostrophes (“...”) or "...". Yet, in other languages, the quotation marks might look different (identical quotation marks below are shown with the same colour)⁹.

UK English	“Let me stand here till thou remember it.”	William Shakespeare
German	„Nun sag, wie hast du's mit der Religion?“	Johann Wolfgang von Goethe
Afrikaans	„Nou maak ek self nie meer so baie saak nie“	Lina Spies
French	«Messieurs, je ne sais pas ce qui m'est arrivé.»	Samuel Beckett
Slovene	„Živé naj vsi naródi“	France Prešeren
Chinese	“己所不欲，勿施於人”	Confucius
Japanese	「古池や蛙飛び込む水の音」	Matsuo Bashō
Finnish	“matkalla ylös kohti kuumaa aurinkoa”	Inger-Mari Aikio-Arianaick
US English	“I can't breathe.”	George Floyd et al.
Xhosa	“Ixesha lifikile ukuba nobuntu.”	Nelson Mandela

- Each sentence ends with a period.

Rocks and soil tell stories about Earth's long history

Rocks and soil tell stories about Earth's long history.

- the correct multiply sign is \times (shortcut key ALT + 0215), not the letter x or the symbol *. In equations you can also use \cdot but not the \bullet , because the latter stands for “radicals” or “operator”
- Do not use an apostrophe to make a word plural.

The 5 container's were rinsed with HCl.

The 5 containers were rinsed with HCl.

- the symbol for “is similar to” is not the \sim symbol, but \approx , which you can find in MS Word by going to “Insert” > “Symbol”. Symbols that you use frequently are saved by Word and show up when you use “Insert” > “Symbol”¹.

$\text{HCO}_3^- \approx 490 \text{ mg L}^{-1}$ ‘the hydrogencarbonate concentration is around 490 mg L^{-1} ’
 $c(\text{Na}^+) \sim c(\text{Cl}^-)$ ‘the Na^+ -concentration is directly proportional to that of Cl^- ’

- do not use the equal sign ($=$) for non-mathematical equality

$E = 1285 \text{ kN/m}^2$

–: no data measured

Thank you = kiitos = enkosi = Dankie = Danke

n.a. = not analysed

- Only use a comma before “and” or “or”, when the preceding sentence has its own subject and object (unless you are using the Oxford or serial comma¹⁰ – but then you need to know what you are doing throughout your text).

“I came, saw and conquered” *but* “I came, I saw, I conquered”

“We analysed the samples and got the following results” *but* “We analysed the samples, and we got the following results”

“This light source can be red, green or blue” *but* “This light source can be red, green, or it can be blue” (when using Oxford or serial commas: “This light source can be red, green, or blue”)

Some journals, such as “Mine Water and the Environment”, require the serial comma. Ensure you are using the correct approach.

- Ensure that you have a space before the opening bracket and after the closing one – except there is a punctuation after the bracket. This also applies to references.

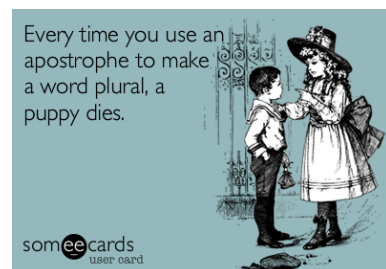
All rocks belong to the Bushveld Complex(Rustenberg suite, Lebowa Granite)in the south.

Acid mine water drains into the streams and requires treatment before its use(Tracy, 1921).

In the north, the rocks of the Transvaal basin are exposed (Wolkberg Group, Pretoria Group).

“One must be continually aware of the limitations” (Rietveld, 1993).

- Remove any spaces before punctuations, but insert spaces after them



Finally ,the president said he has a swimming pool ; it helps in extinguishing fires.

Finally, the president said he has a swimming pool; it helps in extinguishing fires.

- After “furthermore”, “therefore” or “consequently”, you need to write a comma (,), not a semi-colon (;):

Consequently, the mine had to be abandoned.

Units, Equations, Symbols and Formulae

- Use a space between numbers and units. It is a good idea to use a non-breaking, protected space, which you can type in by pressing CTRL+SHIFT+SPACE. This ensures that the number and the unit are always kept together. When you turn on all format symbols by pressing ¶, this protected space looks like a degree sign (°).

12 kg; 45.2 °C; 0.93 mmol

But: 23° for an angle (no space)

- Do not write units in brackets. Neither in your text nor in figures. This is only done when you want to express the units of an equation.

All temperature data was measured in [°C].

$\Delta\vartheta = \vartheta_3 - \vartheta_4$ [°C]

- Avoid using ppm, ppb or ppt for liquids – use mg/L, µg/L or ng/L instead. The Bureau International des Poids et Mesures (2019) recommends that “the terms ppb and ppt are best avoided” because “their meanings are language dependent” and therefore confusing. In addition, when used for water it is not clear if the “parts per” relates to the mass or the volume of the water. ISO 31-0 recommends avoiding the terms ppm, ppb and ppt at all. Therefore, it is recommended not to use any “part per” units for water.
- Write charges of elements correctly

Fe⁺³ or Al⁺³

Fe³⁺ or Al³⁺

- Ensure to use the correct number of decimal places when reporting chemical analysis – each element has its own precision
- use the correct symbol for degrees, which is the shortcut key ALT + 0176 (°); avoid the shortcut key ALT + 0186 (º), superscript letter o, number 0 or any other symbol

$t = 3.2\text{ }^{\circ}\text{C}$, $\alpha = 56^{\circ}$, $4 - 6\text{ }^{\circ}\text{C}$, $100\text{ }^{\circ}\text{C}$, $+23^{\circ}$, $6.40\text{ }^{\circ}\text{C}$

$t = 12.6\text{ }^{\circ}\text{C}$, $\alpha = 56^{\circ}$, $4 - 6\text{ }^{\circ}\text{C}$, $100\text{ }^{\circ}\text{C}$, $+23\text{ }^{\circ}\text{C}$, $6.4\text{ }^{\circ}\text{C}$

- the abbreviation for litre is a capital L, not a small l or an ℓ (the latter commonly used in South Africa). Consequently, g/l and mg/l or g/ℓ and mg/ℓ must be corrected to g/L and

mg/L or, alternatively, g L^{-1} or mg L^{-1} (this follows a 1979 recommendation of the CGPM – Conférence générale des poids et mesures)

- write “electrical conductivity” not just “conductivity” when you mean EC. Its common units are $\mu\text{S/m}$, mS/cm or $\mu\text{S/cm}$, but not μ/Sm
- write μS or mS instead of μMOHS , uMOHS or mMOHS
- write μg , μL or μm instead of ug , uL , um or micrometre
- use the correct SI symbol for the Ohm: Ω
- Distinguish between the prefixes milli and micro: mL (millilitre) and μL (microlitre). You can find the symbol μ in the “Character Map” utility of your system or by using keystroke ALT+0181 (on the number keyboard only)
- the correct unit symbol for cubic centimetre is m^3 , not cc
- The prefix for the kilo is a small k, not a capital one: km, not Km or KM and kg and not Kg or KG. Yet, the prefix mega is a capital M: MPa (mega Pascal) and mPA (milli Pascal) are not the same! The capital K is used for the unit Kelvin.
- Avoid the unit ML (megalitre), as it is not supported by the SI. Convert to m^3 .

There is a flow of 90 ML/d in the Eastern Basin.

The plant can treat up to 120 ML of water.

There is a flow of $62.5 \text{ m}^3/\text{min}$ in the Eastern Basin.

The plant can treat up to $120\,000 \text{ m}^3$ of water. – Do not write 120 km^3 , as this would be $1.2 \cdot 10^{11} \text{ m}^3$. Instead, you could write $120 \cdot 10^3 \text{ m}^3$ or $1.2 \cdot 10^5 \text{ m}^3$

- Some SI-prefixes are used in small and in capital letters but have different meanings: “m” for milli, meaning $10^{-3} = 1/1000$ multiplier and “M” for mega, meaning $10^6 = 1\,000\,000$ multiplier.

1 ms, a small measure of time (millisecond).

1 Ms, a large measure of time (megasecond).

1 mS, a small measure of electric conductance (millisiemens).

1 MS, a large measure of electric conductance (megasiemens).

1 mm, a small measure of length (millimetre; the second “m” stands for metre).

1 Mm, a large measure of length (megametre).

- A unit trap occurs when using SI prefixes for square or cubic units, such as m^2 or m^3 . These two are obvious, as 1 m^2 is an area of $1 \text{ m} \times 1 \text{ m}$ and 1 m^3 is a volume of $1 \text{ m} \times 1 \text{ m} \times 1 \text{ m}$. Let’s say you have 1000 m^2 . Normally you could write 1 km^2 because 1 k is 1000. But 1 km^2 is $1000 \text{ m} \times 1000 \text{ m}$, which is $1\,000\,000 \text{ m}^2$ or 1 million m^2 – and that’s where the problem starts. There are even people who would now write 1 Mm^2 – making the situation even worse. So be careful about using SI prefixes for units that you put in the square or cubic. Instead, use scientific notation for the number, as shown below:

$$1 \text{ km}^2 = 1 \text{ Million } \text{m}^2 = 1 \cdot 10^6 \text{ m}^2 \neq 1 \text{ Mm}^2$$

$$1 \text{ m}^3 = 1000 \text{ L} = 1000 \text{ dm}^3 = 10 \text{ hL} = 1 \cdot 10^3 \text{ L}$$

$$1\,000\,000\text{ m}^3 = 1\text{ Mm}^3$$

- pH has no unit – it even hasn't the unit "s.u." ('standard unit', 'sine unitas') – what you can or should write in tables or figures might be "–" where the unit should be.
- Use SI units without exception and do not explain them in the text. Second, minute, hour and day are written s, min, h, d, respectively. All units, except for the L for litre and the units derived from the names of persons (e.g. S, Pa, V, A), are written in lowercase letters.

Most discharges exceed 2 cubic meters per minute ($\text{m}^3\text{ min}^{-1}$).

When the voltage exceeded 300 v the lamp burnt through.

The experiment ran for 48 hrs.

During the 12 h measurement at a voltage of 2.4 V and a volumetric flow of $2\text{ m}^3\text{ min}^{-1}$, the pressure stayed constant at 912 hPa and the electrical conductivity at $2514\text{ }\mu\text{S cm}^{-1}$.

- use proper notation for scientific numbers. Instead of 0.16E-18 write 0.16×10^{-18} or $0.16 \cdot 10^{-18}$
- The symbols for physical quantities, constants and mathematical variables are written in *italics*:

The mass *m* of the bottle is 142 g.

The volume *V* of the bottle is 1.002 L (1002 mL).

The symbol for the Avogadro constant is N_A or sometimes *L*.

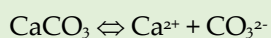
All volumetric flows \dot{V} were constant.

Geologists measure the subsurface pressure *p* for geological evaluations.

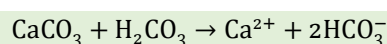
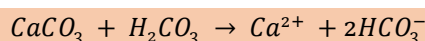
- All symbols for mathematical operators and the abbreviations of elements are written in roman (i.e. not italic) letters.

pH is the negative logarithm of the proton activity: $-\log\{\text{H}^+\}$

dp/dt is considered the rate change of the pressure.



- When using an equation editor, make sure you use the before mentioned hints correctly. You must not in all cases use the automated functions of the editor, as it assumes it is a mathematical and not a chemical formula.



Figures

Figures and Tables are the herbs and spices of your essay. Using too many or less or using the wrong herbs and spices will cause your tucker taste displeasing. It is not much different with your report or manuscript. You need to know how to use them, when to use them and in which way. This section is just about the basics – you will find more detailed formatting hints for figures in the chapter 'Figures' on page 42.

- Use the automatic figure and table numbering of your word processor (<http://bit.ly/Word-ForDissertations>) and cross-reference to the automatically numbered figures and tables throughout your text.
- All figures and tables must be referred to at least once in your text. In addition, figures must be placed after referring to them, never before you refer to them. Furthermore, you need to place the figures in the same order you are referring to them in your text.
- Avoid writing “Figure 2 shows the mine water composition. It can be seen that it is acidic” but write “As can be seen, the mine water is acidic (Fig. 2).” The same is relevant for tables. Please do not write sentences such as “All the data obtained during the XRD investigations is listed in Table 1 and it could be shown that the investigated mineral is schwertmannite”, but write “Based on the XRD investigations, the investigated mineral is schwertmannite (Tab. 1)”. Keep in mind: your *results* show something, *not* your figures or tables. They are just used to present your results visually or nicely compiled.

Figure 3 compares the efficiency of sulfate removal by BaCO_3 .

In a lab experiment, the efficiency of the sulfate removal with BaCO_3 was tested (Fig. 3).

- Avoid sentences like “the result is shown in the figure below” or “as Table 4 above shows” – you never know where the table or figure ends up. You should always refer just to the table or figure (in brackets) without using the word “see” – also; avoid telling your readers what they must do.

Moving rocks reveal the wonders of the dynamic world beneath us (see Fig. 3 below).

Moving rocks reveal the wonders of the dynamic world beneath us (Fig. 3).

- expressions such as “Scale 1:23000” in figures must be substituted by scale bars
- figures must never be placed directly after a heading
- When presenting coordinates, you need to provide the exact geodetic datum. It is not enough to write “... the GPS coordinates of the location are ...”. Each datum consists of the Ellipsoid (*e.g.* ETRS89, DHDN90, WGS84, MGI, ED50, Cape 1880) and the projection (*e.g.* UTM, geographic coordinates). There are thousands of different combinations, and you need to ensure your reader knows what you mean (you can use www.georepository.com to find conversions, the correct potential geodetic datum for your location and converters). Wolfgang v. Goethe’s birth place in Frankfurt(Main), Germany has the coordinates listed in the following table. It becomes obvious, how important it is to refer to the exact geodetic datum – unless you want to mislead your reader on purpose. Even the same projections have a different datum when the Ellipsoid changes. More details about coordinate systems are listed in Bolstad (2008).



Geodetic datum	Projection	Ellipsoid (Geoid)
32U 476941 5551034	UTM	WGS84
32U 477147 5551219	UTM	KKJ (FI 2002) Helsinki
8° 40' 39" E, 50° 6' 40" N	Geographic coordinates	WGS84
8° 40' 43" E, 50° 6' 53" N	Geographic coordinates	Cape (ZA) 1880
3477006 5552815	Gauß-Krüger	DHDN90
3476931 5553255	Gauß-Krüger	ETRS89

- Regression lines must have an r^2 (also written R^2 or R^2). Authors often use regression lines to show that there is a relationship between two parameters. However, in scientific publications it is essential to include the r^2 , which is a measure of how well the data fits the line. A small r^2 indicates that the 'regression' is very unlikely, while a large r^2 indicates that the regression line could be statistically significant for the data you are trying to fit.
- Units in the axis explanations must not be written in brackets.
- To insert a figure or graph into MS Word, save the figure from the original software, preferably in a vector format (see page 46), and then import it into MS Word.
- When copying a figure, then insert it into MS Word with `Insert > Insert Special > Windows Metafile` or, when it was a pixel file, as PNG.
- Always remove the frames around figures. Frames are usually used for obituaries.

Tables

Some general information about figures also refers to tables, therefore you might want to read the above information again. Before you start to create a table, take a short break and think about the table's design. Sometimes, when the data you want to compile in your table can't be easily overseen, it might even be helpful to draw a sketch before you start. Your text processor provides you with all the tools you need to create and format a table – but it's essential to know these tools. Therefore, you should ensure that you read the software's manual, as there are a lot of options to format tables.

Before we go into some details, let me quickly summarize some key points for you:

- Do not use images as tables – always use the table functions of your word processor.

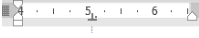
date	flow, L/s	temperature, °C	electrical conductivity, µS/cm
2015-04-26	12,5	23,1	334
2015-05-23	11,9	22,0	368
2015-06-27	13,1	19,8	320

- Format your tables with three lines only: top, under the column headings, bottom. You need to remove all other lines (green colour to highlight this point).

date	flow, L/s	temperature, °C	electrical conductivity, µS/cm
2015-04-26	12.5	23.1	334
2015-05-23	11.9	22.0	368
2015-06-27	13.1	19.8	320

Alternatively, write the units in a second line of the table header

date	flow L/s	temperature °C	electrical conductivity µS/cm
2015-04-26	12.5	23.1	334
2015-05-23	11.9	22.0	368
2015-06-27	13.1	19.8	320

- Use the decimal tabulator  when you have numbers in your table. The decimal tabulator ensures that the decimal points (or commas) are at the same location.

date	flow, L/s	temperature, °C	electrical conductivity, µS/cm
2015-04-26	12,5	23.1	334.1
2015-05-23	11,9	22.0	367.8
2015-06-27	13,1	19.8	320

- Remove columns with the same information and mention that data in the table caption.

Tab. 1: On-site parameters at location EDD (Edendale).

date	Location	flow, L/s	temperature, °C	electrical conductivity, µS/cm
2015-04-26	EDD	12.5	23.1	334
2015-05-23	EDD	11.9	22.0	367
2015-06-27	EDD	13.1	19.8	320

References

- use a reference manager software (*e.g.* EndNote, RefWorks, Citavi or Mendeley)
- ensure that you have **only one** database for your reference manager. Do not work with multiple databases – even when you write different papers. All your work uses one database only!
- do not use references to predatory journals or predatory publishers – or what could be even worse: do never publish in one of these journals. You can find a list of these publishers and journals here: <https://beallist.net>
- References in the text must be part of the sentence. They must not be written behind the text:

Nelson Mandela described himself a ‘water person’ during his opening address. (Fig, 2011).

Nelson Mandela described himself a ‘water person’ during his opening address (Fig, 2011).

- Avoid references to internet sources. Always try to find relevant journal papers or – when you write about general issues – relevant books. In addition, do not refer to a published paper using its URL (**u**niversal **r**esource **l**ocator) but use the correct citation. When possible add the DOI (**d**igital **o**bject **i**dentifier) of the paper as shown in the Casiot et al. (2004) example below. Some journals want the DOI with the http-referrer (for example the Springer Nature journals or the *Austrian Journal of Earth Sciences*), and others just want the DOI without the referrer. Do not add a “accessed at” when you use DOI referrers, as a DOI is a persistent identifier and should, therefore, not change *ad infinitum*.

KUSIN, F. M., JARVIS, A. P. & GANDY, C. J. 2010. Hydraulic residence time and iron removal in a wetland receiving ferruginous mine water over a 4 year period from commissioning. <http://www.ncbi.nlm.nih.gov/pubmed/20962411> [accessed 2024-02-05].

KUSIN, F. M., JARVIS, A. P. & GANDY, C. J. 2010. Hydraulic residence time and iron removal in a wetland receiving ferruginous mine water over a 4 year period from commissioning. *Water Sci. Technol.*, 62, 1937–1946. doi:<http://dx.doi.org/10.2166/wst.2010.495>

CASIOT, C., LEBRUN, S., MORIN, G., BRUNEEL, O., PERSONNÉ, J.C. & ELBAZ-POULICHET, F. 2004. Sorption and redox processes controlling arsenic fate and transport in a stream impacted by acid mine drainage. *Sci. Total Environ.*, 347(1–3):122–130. doi:10.1016/j.scitotenv.2004.12.039 [accessed 2024-02-05].

KUSIN, F. M., JARVIS, A. P. & GANDY, C. J. 2010. Hydraulic residence time and iron removal in a wetland receiving ferruginous mine water over a 4 year period from commissioning. *Water Sci. Technol.*, 62, 1937–1946.

CASIOT, C., LEBRUN, S., MORIN, G., BRUNEEL, O., PERSONNÉ, J.C. & ELBAZ-POULICHET, F. 2004. Sorption and redox processes controlling arsenic fate and transport in a stream impacted by acid mine drainage. *Sci. Total Environ.*, 347(1–3):122–130. doi:10.1016/j.scitotenv.2004.12.039.

SAVOLAINEN, J., PEDRETTI, D. & COLLAN, M. 2019. Incorporating Hydrologic Uncertainty in Industrial Economic Models: Implications of Extreme Rainfall Variability on Metal Mining Investments. *Mine Water Environ.*, 38(2):447–462. <https://doi.org/10.1007/s10230-019-00600-w>.

- When looking for the DOIs of a set of references, you can use the CrossRef web page (<https://doi.crossref.org/simpleTextQuery>). Simply copy a text file with your sanitized references and you will get them back with DOIs as in the example below.

BERTHOD, A. 2009. So What? or Required Content of a Review Article. *Sep. Purif. Rev.*, 38(3):203–206.

GABBOTT, M. 2004. Undertaking a Literature Review in Marketing. *The Marketing Review*, 4:411–429.

LANIADO, M. 1996. How to present research data consistently in a scientific paper. *Eur. Radiol.*, 6(2):S16–S18.

→

BERTHOD, A. 2009. So What? or Required Content of a Review Article. *Sep. Purif. Rev.*, 38(3):203–206.

<https://doi.org/10.1080/15422110903095110>

GABBOTT, M. 2004. Undertaking a Literature Review in Marketing. *The Marketing Review*, 4:411–429.

<https://doi.org/10.1362/1469347042772383>

LANIADO, M. 1996. How to present research data consistently in a scientific paper. *Eur. Radiol.*, 6(2):S16–S18.

<https://doi.org/10.1007/BF00181169>

- Do not omit the names of authors. Always use all their names in the references section. They invested a lot of time and hard work to write the paper. They do not want to be forgotten. An exception might be ATLAS Collaboration (2011) – a paper with more than 3000 authors.

SIBELIUS, J., PENDERECKI, K., KUULA, T., PINGOUD, E., NDODANA-BREEN, B., SONTONGA, E. 1994. The meaning of Words. *Finno-African J. Music*, 1(1), 19–94.

SIBELIUS, J., et al. 1994. The meaning of Words. *Finno-African J. Music*, 1(1), 19–94.

- Journal titles are usually abbreviated. You should write **J. Geochem. Explor.** instead of **Journal of Geochemical Exploration**. Do not write in capital letters (you might find it with capital letters on the internet) and use correct periods in abbreviated words. One-word journal names (*e.g. Tectonophysics*) are never abbreviated. Here is a search tool for journal abbreviations: <http://bit.ly/JournalAbbreviations>

Mine water and the Environment → Mine Water Environ.

Nature → Nature

Acta hydrochimica et hydrobiologica → Acta Hydrochim. Hydrobiol.

- Ensure that you use the correct names for journals. Do not just add the name “journal” after or before the journal’s name. Always look up the correct name of the journal when the word “journal” appears in the name. A good source for looking up journal names is Clarivate Analytic’s (formerly Thomson Reuter’s) “Web of Science” web site.

Mine Water Environ. J.

J. Acta Hydrochim. Hydrobiol.

J. Geochem. Explor.

Mine Water Environ.

Acta Hydrochim. Hydrobiol.

- When a paper has been written by more than two authors you usually name only the first one and then you write *et al.* which, depending on the gender of the authors, means *et alia*, *et aliae* or *et alii* (and others) and therefore the al. has a period at the end. Please don’t write ‘et. al’ or ‘et. al.’ or ‘et al’.
- Restrict the names of publishers to the core of the publisher’s name

John Wiley & Sons

Springer Science & Business Media

Wiley

Springer

- When you have to use keywords for a paper that you submit, use only keywords that are not already in your title. Help your potential reader by using keywords that provide additional information about the paper’s content.

Title: Managing environmental impacts of large artificial sediment loads in rivers

Keywords: Australia, Macquarie Harbour, hydrodynamics, pollutants, geochemistry

Keywords: sediment loads, rivers, case study, environmental impacts

- This is the *minimum* information that you always need for your references. You can find all the details in the relevant guidelines for the reference style you are using:

Journals

authors, year, title, journal, page numbers, doi

Book

authors, year, book title, edition, publisher, place of publication, page numbers, doi

Book chapters

authors, year, chapter title, editors, book title, edition, publisher, place of publication, page numbers, doi

Proceedings

like a book

Proceedings paper

like book chapters

Document Formatting

- use the templates provided by your supervisor(s), the academic institution or the journal in which you want to publish
- don't use any frames around pages or page numbers
- don't use fancy cover images
- ensure that all your pages are numbered
- use the style sheets of your word processor. I often hear that "Word does not do what I want" – of course, when you don't tell word what you want – how shall it know. Style sheets are a way of properly formatting your word document and word takes care of most of the rest. (<http://bit.ly/WordForDissertations>)
- remove all hyperlinks – they look ugly and disturb the reading process

<http://bit.ly/OfficeHyperlink>

Oscar.Pistorius@KgosiMampuru.dcs.gov.za

<http://bit.ly/OfficeHyperlink>

Oscar.Pistorius@KgosiMampuru.dcs.gov.za

- Avoid underlining of words in all cases – it is simply not done anymore because it dates back to the time of typewriters where people had underlining as the ONLY way to emphasize content; use *italics* or **bold** instead – the underlining "kills" the descenders (meanwhile, some text-processors and web pages do underlining correctly: hurray!)
- Use proper subscript and superscript in chemical formulae

H₂SO₄ is a strong acid, while H₂CO₃ is a weak one.

H₂CO₃ is a weak acid when CO₂ is dissolved in H₂O.

- Unless you are producing a final document, *e.g.* for your own publication process in a thesis, do not format your graphs – just import them into your word processor. Avoid normal

copy-and-paste as this does produce images of low quality or it blows up the size of your document. For more details have a look to page 39.

- Delete all double spaces in your text (hit CTRL+H in MS Word to find and replace text). Double spaces might have been used in the time of typewriters – but they are not necessary anymore (and where even not necessary or at least questionable at the time of typewriters).
- Remove spaces at the beginning or end of paragraphs (press the symbol ¶ in MS Word, to see all formatting symbols in your text)
- never format your text with multiple spaces, lines or tabs – always use the appropriate formatting tools (e.g. tab formatting, paragraph formatting) provided by your word processor. Whenever your fingers want to press the spacebar more than once, you very likely have a case for a tab instead.

Author.....	Dr. Multiple Spaces¶
Co-Author → → →	Mr. Many Tabs¶
Editor →	Prof. Correct Formatting¶
Supervisor →	Another one Correct¶

- remove all empty lines (never use them for formatting text). The only exception is after tables, where you can use an empty line to separate the table from the text. But – it’s really the only exception, where you can use an empty line for formatting (there would be an option without an empty line, but it’s more laborious)
- remove all double tabs (do not use for formatting text)
- never use hard return (“enter”) or page breaks or section brakes to format your text when you are preparing a report or a paper – detailed formatting should only be done by the final editor
- for equations and formulas use the equation editor
- Write words from foreign languages in *italics*. This is especially true for Latin names of organisms. Words from South Africa’s 11 official languages – some claim it to be 13 – are never written in italics. Some journals might have differing style guides – always refer to them when writing a paper (e.g. the ASA–CSSA–SSSA Publications Handbook and Style Manual).

Kelly & Wood (2000) gave the bacteria the new name *Acidithiobacillus thiooxidans*.

All samples were taken *in-situ*.

A first tracer test at the abandoned *Georgi Unterbau* mine in Austria showed positive results.

All springs from Tweebuffelsmeteenskootmorsdoodgeskietfontein show buffalo DNA.

They said “*Hamba kahle*” and walked away.

- You don’t need to know all the details of the “International Code of Zoological Nomenclature”, but at least the following hints are relevant:

Pseudophillipsia (Carniphillipsia) ogivalis javornikensis G. & R. HAHN, 1977

pseudophillipsia Javornikensis (HAHN).

- Avoid using CAPITAL LETTERS IN YOUR TITLES, TEXT OR FILE NAMES – it is considered “shouting out loudly”. Use SMALL CAPS instead or other ways of outlining something (e.g. *italics*, **bold**, other font).
- Some fonts have two different formats for numerals called “standard figures” and “text figures”. You would use text figures when writing text and standard figures in your tables. Word allows you to choose which one you want to use. You find it in the Font Dialog Advance tab under ‘Number forms’. Choose either ‘Default’ or ‘Old-style’. The following numbers are text figures (‘old-style’): 1234567890 and these standard figures (‘Default’): 1234567890.
- Avoid using the fonts Arial and Times New Roman – reading them tires your eyes. Use the better designed and consequently easier readable Calibri (used in this text) or Cambria (especially for very long text as in a thesis or report). If you want to be more “innovative”, use the Corbel or the Palatino Linotype (used here for the example sections). When writing your CV, you might consider using the Garamond, which looks also very nice – and sets you apart from all the Arialers and Times-New-Romaners. Do not use the Candara for scientific text (I used it for the heading in square brackets []). You can use it to invite your friends to a party or your wedding. Under all circumstances avoid the **Comic Sans** – this font is a no go¹¹. In short: stop being boring when choosing your fonts and try something else – as long as your font face matches the face of your content.

This does not imply that **Arial** is not necessary anymore.

In addition, the **Times New Roman** will find its niches in the future.

It just means that the **Calibri** from Luc(as) de Groot is easier to read and more thoroughly designed.

If you want to be more innovative, use the **Corbel** from Jeremy Tankard – you will find nice ligatures.

Unfortunately, Paul Renner’s **Futura** got a little bit overused in the past decades.

Interested in something easy to read: why don’t you use the **Segoe UI** designed for Microsoft.

In 2023 Microsoft introduced the new “standard” font for Office products: the **Aptos** from Steve Matteson.

It also comes as the **Aptos Serif**, so that you can combine text and headings nicely with each other.

The **Cambria**, also used by Microsoft, is easy to read and a nice piece of typography.

Add some extravagancy to your texts by using the **Palatino**, designed by Hermann Zapf.

Moreover, a CV written with Robert Slimbach’s **Garamond** sets you apart from your competitors.

Using the **Minion** from the same designer is always a good idea, as it can easily be read.

But using the Bodoni from Giambattista Bodoni for a modern text might be considered outdated.

It is known that John Hudson, the Designer of the **Constantia**, didn’t like the name of his font.

What do you think about the **Philosopher** from Jovanny Lemonad?

One of the rare fonts designed by a woman is the **Lucida** from Kris Holmes & Charles Bigelow.

And when you are writing about Art Nouveau, you might consider the **Amarante** by Karolina Lach¹².

For text with an African context, you will like the **Kigelia**, which was specifically designed for that reason.

Though the **Candara** from Gary Munch looks nice, you should only use it for informal documents.

But, with the **Comic Sans** you should not give a presentation – except about 'doge meme'.

- A discussion about using the correct font would be a section on its own. You should ensure that the font's history fits to your subject and that your font has all the diacritics ("letters") that you intend to use. It does not make sense to write a book about classic Greek poetry and then you use a font that has been designed by a Baroque type designer (Bringhurst, 2012). Most people might not notice, but the experts will, and that might disqualify your text in their eyes. Or, as nice as the Futura might look like, if you do not have *all* the diacritics of the language in which you are writing you might end up in something unprofessional as this: Přísňě (the ř and the ě don't exist in most of the Futura fonts you have on your system – you need to invest in a version with all the diacritics, if you insist on using the Futura).

Miscellaneous

- state your name
- do not use key words that are already in the title of your paper
- use "normal" page numbering instead of "fuzzy" ones
- Distinguish between ORP (potential of the electrode) and Redox Potential (based on the standard H₂-probe) – the difference must be calculated and ranges, depending on the type of electrode, between 197 and 334 mV at 25 °C. If you need a conversion tool, visit this web page: www.wolkersdorfer.info/orp (in German and English)
- When writing dates in the text, skip leading zeros. Keep them when in table form. In addition, to ensure people understand your date correctly, use the ISO date format¹³ (**with** leading zeros) instead of local ones.

Our sample was taken on 05.02.2024

All the containers arrived 24/2/5 or did you mean 5/2/24

The pump test started on 2024-02-05 (*international date format*)

Access to the document was provided on 5 February 2024 (*no leading zero*)

- In the methods section of your manuscript, instruments used must always cited like that: name of instrument, manufacturer of the instrument, (town,) country. Do not write simply "Made in Taiwan".

Laboratory vibratory pulveriser (model IMZ-100, made in China)

IMZ-100, TF Laboratory Assay Equipment Factory, China

HQ40d Portable Meter, Hach Company, Loveland, USA

- NAVSTAR GPS (USA), GLONASS (Russia), Galileo (GNSS, European Union – and whatever the UK comes up with) or BeiDou (China) are all satellite-based technologies that allow coordinates to be determined with some accuracy. None of these can be used as a substitute for a correct geodetic datum. It is therefore always necessary to record the datum to which the GPS data has been converted. Finally, GPS heights are calculated heights based on the ellipsoid. They can never be used to record the true elevation of the geoid unless corrected accordingly.

Geographic position system (GPS) will be used to record the positions of sampling points.

The GPS coordinates of the sampling location are 476941 5551034.

All coordinates of the sampling points were measured with GPS-receivers and tabulated as UTM WGS84 coordinates.

GPS-data will be used to record the positions of sampling points.

- You must not use references in your summary or abstract section.
- When you have sections that you want to fill in later or words or expressions that you need to look up, use the double hash tag to mark them like that: ## – before you finalise your document search for the double hash tag – in addition it can easily be seen when printed or on the screen. Do not use one # or three ###. Two is enough and you can simply search for them at the end of your writing process.

Zuma told the public that taking a shower helps ##add references.

Northern lights are not only common to Finland but can also be seen in ##where else?

Out of ##how many## water samples, only three have drinking water quality.

Submitting your Manuscript to a Journal

When publishing your manuscript, you want to choose a journal with a Journal Impact Factor (JIF), which is calculated using Clarivat's Science Citation Index (SCI). There are X other institutions that calculate scores or impact factors. However, many are designed to mislead researchers. You should therefore never use any other impact factor than the JIF when deciding where to publish. The journal must explicitly state that it has a JIF. You should also find out if the journal is abstracted and indexed in the "Science Citation Index Expanded (SciSearch)". All other indexes are irrelevant in most cases (and be careful: some journals use an index that sounds very similar but is not). To be on the safe side, you should always look up the journal in Web of Science.

To make sure that you have all the relevant documents at hand when you want to submit your paper, you should carefully read the instructions for authors on the relevant web pages. These vary from journal to journal, and it shows respect for the editor's work if you follow them closely. Do not forget to include a cover letter to the editor in which you explain the content of your manuscript and why you think it is relevant to the journal's readership.

Before submitting your manuscript, you should convert it to plain text. This means removing all hyperlinks, references, reference manager links and automatic numbering. To "consolidate" your MS Word file, select all your text (CTRL+A) and then press CTRL+SHIFT+F9. Then save this file by adding the word "cons" or "consolidated" at the end of the file name so that you can identify this version. If the submission system does not automatically number your lines, please use your word processor to do this. Make sure that the numbering is continuous and does not start with 1 on each page, as this will help the reviewers to refer to your text correctly.

Use this check list for your **initial** submission to a journal:

- ☐ Cover Letter
- ☐ Graphical abstract (also called *Graphic summary*)
- ☐ Highlights
- ☐ Manuscript (including figures and tables included)
- ☐ CRediT taxonomy¹⁴ (alternatively in the manuscript)

- ☐ Funding of the study (alternatively in the manuscript)
- ☐ Electronic appendices (if applicable)
- ☐ Declaration of competing interests (if applicable – this is **not** the funding declaration)

When figures and tables are not included in the initial manuscript:

- ☐ Figures (original file format, see below, without any captions)
- ☐ Tables
- ☐ Text file with figure and table captions

When submitting the **final** version of your manuscript, you will need to upload your figures as individual files (for details on figures, see chapter ‘Figures’ on page 42). Many publishers allow you to submit your final figures within the Microsoft Word file. However, you should avoid doing this because, depending on your settings, Word will compress images to a lower resolution – rendering your images into low quality figures. In addition, figures created using your word processor’s graphics tools (e.g. MS Graph) cannot be used in a high-quality editorial and printing process. Therefore, consider preparing your figures outside of Word from the start of your manuscript, as high-resolution images will ensure good print quality. Please name your figure files as follows: smith_fig1.eps, smith_fig2.tif, smith_fig3.pdf. The following table will give you an idea of which image format you should use for which type of figure in your final submission (see also the table on page 48):

Image Type	Category	File type
Scanned image	Raster	TIFF (600 dpi)
Photograph from digital camera	Raster	JPG
XRD, XRF data	Vector	EPS, PDF
Line graphs (e.g. Corel Draw, Adobe Illustrator)	Vector	EPS, PDF
Google Earth	Raster	TIFF, JPG
GIS applications (e.g. ArcGIS, QGIS)	Vector/Raster	EPS, PDF
MS Excel	Vector/Raster	EPS, PDF
Scientific Graphic Software (e.g. SigmaPlot, ParaView, Origin)	Vector/Raster	EPS, PDF
Location maps, geological maps (e.g. Corel Draw, Adobe Illustrator)	Vector	EPS, PDF, TIFF
EDS images	Raster	TIFF

When you receive the proofs of your paper, you should read them very carefully to spot any potential errors that either you or the publisher may have overlooked. Because the publishing industry, “in which there is officially no culture other than commerce and no purpose other than financial gain” (Bringinghurst, 2012, p. 111), is a fast-paced business, you may not expect them to proofread your own article. You need to do this carefully, and you should also point out typesetting errors, such as splitting numbers and units between lines.

How to write the Acknowledgements

[that part can be very tricky – whom to include whom to leave out – at least: be fair]

In the acknowledgements, you thank the persons or institutions who made your work become reality. This includes your supervisors, colleagues who helped you, institutions that provided you with grants or financial support, companies that gave access to data, proof-readers, friends who set up software, other friends who helped to reinstall your operating system after your 481 pages thesis crashed while formatting the last chapter, your family and your partner. A good order might be: funders, supervisors, other academics, colleagues, family and friends. Please keep in mind that it is not always a wise idea to include any gods in your acknowledgments or dedication, as you might insult colleagues and readers from other religions. Natural science should be free of any religious or political

statements, even in the acknowledgments. A good example (though it deviates from the above structure and we cannot immediately identify the supervisors, which I highlighted in bold) for a thesis is provided on the web page <https://acknowledgementsample.com> (the version I give here is closer to the original), which has been modified from Ernest Alexander Kristian Heuer's thesis on "Formulation and stability of model food foam microstructures". My personal feeling is that the supervisors should be closer to the beginning, but I like the personal touch of Ernest's acknowledgements:

*Gutta cavat lapidem non vi sed semper cadendo, sic fit homo sapiens, non vi sed saepe legend.*¹⁵

Acknowledgments

To my life-coach, my late grandfather L. N. Lee: I owe it all to you. Thanks!

The Latin phrase above is one he liked quoting behind the cover of all his books, and I could not think of a more fitting place in which to be able to use it.

My eternal cheerleader, late W. J. Lee: I miss our interesting chats. My forever interested and always enthusiastic late grandmother Ava Lee: she was always interested to know what I was doing and how I was proceeding, although might not have always grasped what it was all about! I will miss your squeals of joy whenever a significant milestone was reached and also just your general cheekiness.

To both my sibling and also my mother, Anna and Camila respectively: your moral and emotional support has been invaluable. And also to all my family and friends who have supported me along the way.

A very special gratitude goes out to all down at Podington and also Ridderkerk for helping and providing the funding for the work.

With a special mention to David Lee, Oliver Trigam, Logan Leonardo, Daan van Venter, Mathias Dennler, Kirk Nordland, the pilot plant team, Snow-Dairy, IRHFU and ATU in general. It was fantastic to be able to do a great part of my thesis work down there. What a cracking place to work!

On the Birmingham side, great thanks also to **James Southfield**, Harry Lee, Jake Dunfree, Daniel Brownfield and **Berat Abbache**, for their unfailing support and assistance and the FQTSD for funding the Eng.D.

To Chris and Tana for a Tribometer graph (oil and water comparison).

And finally, last but by no means least, also to everyone in the α -lab ... it was great sharing lab-space with all of you.

Thanks for all your encouragement!

In the past years, it seems to become custom, to include everybody who contributed even a small, tiny bit to a paper as a co-author. Sometimes, I even see that copyeditors or proof-readers of universities are included or the lab person of a company who did the chemical analysis. Yet, this somehow contradicts the idea of "authorship"¹⁶. I think, I won't make many friends when I write about labs, where the director of the lab is always the first author of a paper. Having become aware of this tendency of "false" co-authorship, many journals now require that the contribution of each author and co-author to the paper be listed at the end of a paper. It does not solve all the issues, but at least it is better than doing nothing. Yet, the correct approach for the above cases is to include those people in the acknowledgements. This section of your essay should list all persons or institutions that contributed to your work, but not to the paper itself. Here is a very good example of an acknowledgement for a scientific paper from Wennervirta and Papunen (1974):

ACKNOWLEDGEMENTS

The publishing of the present study was authorized by the Chief Geologist of the Outokumpu Oy, Dr. P. Haapala, and the Director of Exploration, Mr. P. Isokangas. The geologists of the Metsämonnttu mine gave valuable aid in sampling. The mercury determinations were performed in the Central Laboratory of the Outokumpu Oy under the guidance of Mr. O. Lindsjö. All the other analyses were done in the Geological Laboratory of the Outokumpu Oy under the supervision of Dr. T. A. Häkli. The statistical treatment of the data was done by Mr. V. Suokonautio with an IBM 360/40 computer in the Computer Centre of the Outokumpu Oy. Mrs Cillian Häkli translated a part of the paper into English. To all these people we want to express our cordial thanks.



I think, if they would write their paper today, the authorship might read: Wennervirta, H., Papunen, H., Suokonautio, V., Lindsjö, O, Häkli, A., Häkli, C., Isokangas, P. & Haapala, P. 1974. Well, you know my opinion – I am in the old tradition of “the writers shall be the authors”.

Figures

Introduction

[A figure that looks good on the screen will not necessarily look good when printed]

Graphs and figures are essential in scientific papers published in the area of natural sciences or engineering. Therefore, you need to know, what graphs are and how to use them properly. Generally, there are two types of graphic formats: pixel graphs (also called raster graphs) and vector graphs (also called line graphs). In a pixel graph, each part of a graph consists of a single dot, which is characterized by its size and colour. Examples are the photographs produced by your digital camera, a screen shot or an image from a graphic scanner (e.g. file formats JPG, TIF, BMP, PNG). Vector graphs, however, consist of graphic elements that are described with equations consisting for example of length of line, width of line, radius of circle or colour in a colour palette (e.g. file formats EPS, WMF). Whilst pixel graphs can't be up- and downscaled to any ratio (if at all), vector graphs usually are scalable without losing information. This is the reason why vector graphs should be favoured over pixel graphs, as you can see in the following images.

High quality, EPS vector file:  and low quality, scaled pixel file: 

In any case: always keep in mind that whenever you can compose an image with lines or objects, you must use a vector programme. Should you want to optimize camera images, you must use a raster programme. All image manipulations must include all parts of the image, you are not allowed to selectively change parts of your images or remove disturbing elements. This is considered fraud, as you are working scientifically. However, you can crop your images to focus on the relevant parts of your picture.

Should you want to get inspired by an artist who wrote excellent books about graphs and images and how you can use them to express what you have in mind, you should read the books of Edward Tufte. He writes in his first book, and I agree with him without reservation:

“To envision information – and what bright and splendid visions can result – is to work at the intersection of image, word, number, art. The instruments are those of writing and typography, of managing large data sets and statistical analysis, of

line and layout and color. And the standards of quality are those derived from visual principles that tell us how to put the right mark in the right place.”

Edward Tufte in ENVISIONING INFORMATION

General Hints

[those things that need to be mentioned but don't fit under another heading]

Preparing figures and including them into your text is a science of its own and a guide about using figures would be another one or two dozen of pages. Yet, nowadays we are expecting that you are familiar with composing graphs and images as well. Composing a good image for your text might take as long as composing the text to describe the image itself. You should also understand that there are pixel graphs and vector graphs, and they have different qualities and usages. Use the high-quality vector graphs whenever possible. See also chapter 'Figures' on page 29, which is about placing your figure in the text.

- Only plot or draw “data”. Avoid everything in a graph that has nothing to do with your data
- remove all your frames around figures – only obituary notices should have frames
- You must refer to all figures and tables in your text. Usually, a figure or table is first referenced in the text and thereafter you place the figure or table.
- The captions of tables or figures must not be part of the table or figure. Also, do not write the figure's name into the figure.
- Crop everything of a figure that you do not need – especially white space. If necessary, use an appropriate image-processing tool such as Gimp (freeware: www.gimp.org), Photoshop (www.photoshop.com) or Paint Shop Pro (www.paintshoppro.com). Avoid “MS Paint” which comes with Windows™ – you might just worsen your figure. A simple but quick tool is Xnview from Pierre-Emmanuel Gougelet (freeware: www.xnview.com).
- Use vector graphs instead of pixel graphs for scientific images. Do not convert them into JPG or TIFF files. A free programme to produce and manipulate vector graphs is Inkscape (www.inkscape.org).
- When you need to use a pixel graph, avoid JPG files whenever possible – use high quality TIFF files as often as you can, alternatively PNG. An exception are the JPG files coming from your digital camera – but make sure you use the highest camera resolution possible.
- Use line graphs to show relationships or trends between values and box plots when there are no connections between the measured data.
- When you are writing for a journal or when you are collaborating with colleagues only use “in-line” graphics. Do not format them and try to place them “nicely” in your text – the final editor of your text always does this step.
- When you are writing for a journal or when you are collaborating with colleagues do not use the build in drawing functions of MS Word. Always use external software that produces high quality line graphs or images, export them to a vector format for line graphs or TIFF for pixel graphs and import them into your word processor.
- Do not copy and paste graphs, but instead use paste → paste special (extended WMF). A better solution to include graphs is to save your graph on your hard disc and importing it into Word. Moreover, please keep in mind: low quality JPG or BMP files should not be used, as they are optimized for a screen resolution, but not for printing. Always use high

quality figures (width at least 1000 pixel) or – even better – try to use a vector format (such as EPS, WMF). PDF and EPS files can't be imported into Word. These types of files are used for submitting them to the printer in scientific publishing.

- When using graphs from spreadsheet programmes, please remove the frame's line from the graph border and legend. In addition, remove all grid lines from the graph and make sure that you explain all abbreviations used in the graph's caption.
- A figure that looks "good" on your screen does not necessarily look "good" when printed. Your screen has a "resolution" below 100 dpi (if we convert the screen dots to print dots) and a high-quality printing process uses between 300 and 1600 dpi. If you enlarge your figure on the screen by at least 400 % and you see large "steps" you can assume that it is unsuitable for printing.
- The minimum width for a good figure quality in printing is 1 000 px, but better use 2 000 px image width. Do not enlarge smaller images, or save them with higher widths, as this will make them even worse. Always use the original images from your camera or from your image processing software.
- When you are enlarging or scaling down a figure, make sure you scale width and height with the same scaling factor. Never distort figures or maps.
- The number of digital places on the x- and y-axis of scatter diagrams must be the same, except you are using a logarithmic scale:

0 – 0.5 – 1 – 1.5 – 2 – 2.5

0.0 – 0.5 – 1.0 – 1.5 – 2.0 – 2.5

0.001 – 0.01 – 0.1 – 1 – 10 – 100 – 1000

$1 \cdot 10^{-3}$ – $1 \cdot 10^{-2}$ – $1 \cdot 10^{-1}$ – $1 \cdot 10^0$ – $1 \cdot 10^1$ – $1 \cdot 10^2$ – $1 \cdot 10^3$

- maps must have a scale and north arrow or coordinates
- your figure legend and the caption must explain everything we see in your image or graph. Make sure your reader is not left alone when seeing your figure

Let's summarize by using the words of Tufte (2001):

- Above all else show the data – Maximize the data-ink ratio – Erase non-data-ink – Erase redundant data-ink – Revise and edit.
- Forgo chartjunk, including moiré vibration, the grid, and the duck.

Free Software Tools

As described above, there are several free tools available for designing images, manipulating them or viewing your images. There is no silver bullet that can do everything you want to do with an image, especially, as there are two types of images (raster and vector):

- Inkscape (free Vector Programme): www.inkscape.org
- Gimp (free Raster Programme): www.gimp.org
- paint.net (free Raster Programme): www.getpaint.net
- XnView (free Image Viewer): www.xnview.com/en
- gnuplot (free scientific graphic package): www.gnuplot.info

Copyright

[important – even without the © symbol]

This section is about copyright issues. Please read this section carefully and modify the captions of your tables and graphs if necessary. No other references to other work is allowed to ensure compliance with international or national copyright, as figures, such as text from a paper or book, are copyrighted – even when there is no copyright © symbol. In the US, for example, the copyright symbol is not needed anymore to mark “copyrighted” work, but it was legally necessary before 1989-03-01. If you want to know more details, you might want to read publications about the “Berne Convention for the Protection of Literary and Artistic Works”.

Once you are done with your paper or thesis, please carefully check the following items:

- are all your figures complete?
- do the captions match your figures?
- are the figures exactly as you want them?

You need to ensure that the references to figures that are not your own are absolutely correct. There are 4 ways to cite figures or images:

Reference	Meaning
from*	figure or image is EXACTLY the same one as in the original publication (e.g. you got it from the author, or you scanned it)
after	figure or image is the same one as in the original publication, but you completely redrew the figure or image
modified from*	figure or image is EXACTLY the same one as in the original publication, but you added or erased some details
modified after	figure or image is the same one as in the original publication, you completely redrew the figure or image and you added or erased some details

An asterisk (*) in the above table means that you need written permission of the original author (except the original author is you) or, when it was published in a journal, from the publisher. Most journals now have a section on their web page called “Rights and permissions – Reprints and Permissions”. By clicking, you should be redirected to the Copyright Clearance Center (www.copyright.com), where you type in all the relevant information about your publication, and you should be granted permission to use a figure. Written can also mean an e-mail (in a thesis this might be less relevant, but in a paper that you want to publish it *is* relevant).

Each reference to a figure must clearly use one of the above four options. Just writing

Fig. 6.62. Iron saturation indices for metal-mine pit lakes (Miller 2001).

is not enough, as an example, it must be (or any of the above 4 options)

Fig. 6.62. Iron saturation indices for metal-mine pit lakes (modified from Miller 2001).

Google Earth and Google Maps Images

[what would we be without it – but learn to use it correctly]

It becomes more and more common to use Google Earth or Google Maps images in publications. Therefore, some hints about their correct handling in your essay. You are only allowed to use Google Earth or Google Maps when the Google copyright and Google logo are clearly seen AND if the source is properly mentioned in the caption. Google without a doubt says on their web site:

“You can personally use an image from the application (for example on your website, on a blog or in a word document) as long as you preserve the copyrights and attributions including the Google logo attribution. However, you cannot sell these to others, provide them as part of a service, or use them in a commercial product such as a book or TV show without first getting a rights clearance from Google.

If you require these commercial rights, please visit Google’s permissions guidelines. You can then submit your application through our online request form.”

You, as the author of your text must ensure that you follow Google’s copyrights. An example of a correct caption is here (Geller et al., 2013):

Fig. 5.54 Map showing the relationship of the pit lake to Wollaston Lake. The pit lake to the north of the B-Zone Pit Lake is the D-Zone Lake. The waste rock pile is in the southeast corner of the map. © Google and Digital Globe (2011)

Artificial Intelligence

Large Language Models

[My LLM hallucinated again and messed up my references]

Since ChatGPT was released to the public in 2023, large language models have become an increasingly important tool for solving many problems in everyday life. More or less at the same time, artificial intelligence-based graphical models were also released. Both are widely used by researchers and students for writing tests or papers. However, these tools should only be used for brainstorming, not for writing papers. There are many reasons for this, but one of them is that they also give the wrong answers. Most publishers and universities do not allow AI to be cited as a co-author, and almost all require that the use of AI is clearly stated and that it was not used to write the content. Elsevier, for example, requires:

“Authors must disclose the use of generative AI and AI-assisted technologies in the writing process by adding a statement at the end of their manuscript in the core manuscript file, before the References list. The statement should be placed in a new section entitled ‘Declaration of Generative AI and AI-assisted technologies in the writing process’.

Statement: During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

This declaration does not apply to the use of basic tools for checking grammar, spelling, references etc. If there is nothing to disclose, there is no need to add a statement.”

If any type of artificial intelligence is used to get research ideas or to assist in writing, it is essential to verify that the content is correct and that it matches the requirements of a journal or the supervisor. Let's have a look to an example. The following text was generated by ChatGPT using this prompt:

CW: Explain in 100 words what acid mine drainage is and provide one relevant reference.

ChatGPT: Acid mine drainage (AMD) is a harmful environmental phenomenon resulting from the oxidation of sulfide minerals in exposed rocks during mining activities. This process generates acidic water, often rich in toxic metals, contaminating surrounding soil and water bodies. AMD poses severe ecological threats, affecting aquatic ecosystems and endangering human health. The acidity and metal content can persist for years, causing long-term environmental damage. One relevant reference is: Nordstrom, D. K., & Alpers, C. N. (1999). Negative pH, efflorescent mineralogy, and consequences for environmental restoration at the Iron Mountain Superfund site, California. *Proceedings of the National Academy of Sciences*, 96(7), 3455–3462. doi:10.1073/pnas.96.7.3455

This sounds very good, but the first sentence is wrong. Only three minerals contribute to the formation of AMD: the di-sulfides pyrite and marcasite and the sulfide pyrrhotite. All other sulfides do not contribute to the formation of AMD. The next error in the first sentence is that AMD coming also from tailings and waste rock not mentioned at all. The second sentence must refer to *potentially* toxic metals, because not all of them are toxic at the concentrations we found. The next sentence talks about endangering human health. But there are no cases of AMD endangering human health. So this is also wrong. The reference is correct and indeed relevant.

You are allowed to use artificial intelligence based large language models to get insights into a subject or an idea, but you should never copy and paste from such a tool, unless you verified from independent sources that the answer is correct.

Language or Grammar Correction

More and more tools are getting available for grammar correction or text translation or for improving whole texts. From my point of view it is perfectly fine to use them, as they help to improve the way we communicate with each other. Tools based on artificial intelligence are for example Grammarly or www.DeepL.com, www.DeepL.com/write or www.quillbot.com.

The following example shows you how www.DeepL.com/write improved an earlier version of the above paragraph.

Since ChatGPT was released publicly in 2023, large language models became a more and more prominent tool for solving many problems of daily life. More or less at the same time, also artificial intellect-based graphics models were released. Both of them are extensively used by researchers and students for writing essays or papers. Yet, these tools should only be used to collect ideas and not to write who essays. The reasons for that are multifold, but one of many is, that they are also giving false answers.

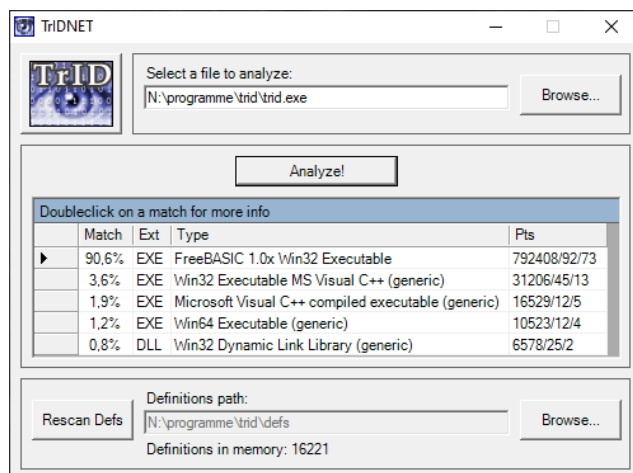
Since the public release of ChatGPT in 2023, large language models have become an increasingly important tool for solving many problems in everyday life. More or less at the same time, artificial intelligence-based graphical models were also released. Both are widely used by researchers and students for writing tests or papers. However, these tools should only be used for brainstorming, not for writing papers. There are many reasons for this, but one of them is that they also give the wrong answers.

Using these tools is allowed but should be referred to in a remark section of your contribution.

File types and what to use them for

[xœ½=äsÜ6™Éàæ´Çbà*ñÛ¹şÜn6u&Ý* %ÊÖÔUI®7ÿp]LBR,ÊíÄ-Hßß¿¹XmfÓr¼P¾#s±Ü”ä»j]

You might get something like the above line when you use the wrong file type in an application. File types are recognized by the letters or numbers after the last dot of a file name (hint: never use dots or commas in file names – a file name should only have **one** dot to denominate what type of file it is). If you want to produce a good manuscript or thesis, it is important to know, what type of file does what. As most scientists are using Windows operating systems, these “Tips & Tricks” will only focus on Windows filename extensions. I apologize, should you be a Mac user and were happy with this text so far. Yet, don’t skip this section as I am also going to write about more generic questions relating to file types in this section. First – and I can’t point that out often enough – read the manual of your software or dive through a tutorial to understand what file types your software can use and produce. I also recommend reading the chapter ‘Figures’ as you will get some hints already. Don’t expect me to explain all possible file types here. There are several thousand. If you want to analyse unknown filename extensions, you might want to use the “TrID – File Identifier” (<https://marko.net/soft-trid-e.html>), which – at the time of writing this sentence on 2024-01-23 – recognises 17 066 unique file types.



Allow me to focus on the most common file types when working on a manuscript, thesis or essay. When you are compiling a video, you are wrong here anyway, therefore I won’t speak about “uncommon” files when working with texts. In addition, to make it easy for you, I compiled the information in a table. File types written in **bold** are preferred for importing into Office products, and file types in *italics* are preferred by the publishers for images. Grey indicates file formats that must not be used anymore, as they are deprecated.

When working with graphs you need to ask yourself: is it a line graph made in a vector programme (e.g. Illustrator, CorelDraw, PowerPoint) or a raster (pixel) image made in a graphics programme (e.g. Photoshop, Paint Shop Pro, Paint Net, Gimp). To keep the highest possible quality, you need to export or save from these programmes into the correct filetype, based on the category you need.

Filename extension	Category	Usage	Word import
BMP, DIB, RLE: Windows Bitmap	Raster	Do not use anymore	Yes
DOC or DOCX	MS Word text file	Contains all information and text that is relevant for viewing and printing a text document. Can incorporate plain text, pixel graphs and vector graphs. For smaller file sizes you should only use the new DOCX-format	Yes
EMF: Windows Enhanced Metafile	Vector graphics	High quality images in MS Office products	Yes
EMZ: Compressed Windows Enhanced Metafile	Vector graphics	High quality images in MS Office products	Yes
<i>EPS: Encapsulated Post Script</i>	Vector	high quality images for printing, it encapsulates a low quality TIF or JPG image which is only used as a preview. The file uses a page description language which describes how to print the page. Avoid for pixel images.	No

Filename extension	Category	Usage	Word import
GIF: Graphics Interchange Format	Raster	Do not use anymore	Yes
JPEG, JPG, JFIF, JPE: JPEG File Interchange Format	Raster	Avoid unless you have photographs from a digital camera	Yes
PDF: <i>Portable Document Format</i>	Vector	high quality images for printing and viewing. The file uses a page description language which describes how to print the page. Avoid for pixel images.	No
PNG: Portable Network Graphics	Raster	Preferred format for raster images as the files are comparably small but of high quality	Yes
SVG: Scalable Vector Graphic	Vector	High quality line graphs	Yes
TIF, TIFF: Tagged Image File Format	Raster	High quality format for raster images	Yes
WMF: Windows Meta File	Vector graphics	High quality images in MS Office products	Yes
WMZ: Compressed Windows Metafile	Vector graphics	High quality images in MS Office products	Yes
XLS, XLSX: MS Excel	Spreadsheets	Contains all information and data that is relevant for viewing and printing a spreadsheet. For smaller file sizes you should only use the new XLSX-format. Do not directly import Excel files into MS Word.	No

Spreadsheets

[one of the best things that could have happened to science – and one of the most misused as well]

Spreadsheets are used to organize your data in a systematic way so that you can also use it for your report, paper or thesis. They are a powerful tool for calculating, solving simple equations or sets of equations or draw graphs of your data. Yet, they are not a replacement for professional scientific graphic programmes such as SigmaPlot or Origin, and whenever you have access to scientific graphic programmes, you should use a spreadsheet to organize your data but that graphic software to plot your data scientifically correct. As mentioned earlier: watch a tutorial for the spreadsheet software you are using or get a good book in your local library.

From time to time, I see that researchers are calculating numbers with their calculator and then type those numbers into the spreadsheet. Yet, another name for spreadsheet is “table calculation” – which means you can do **all** your calculations within the spreadsheet. Most spreadsheet programs have hundreds of mathematical or statistical build in functions that you can find in the help or in relevant books. You can even manipulate text or convert text into numbers or vice-versa.

One of the key issues in spreadsheets is how to organize your data in a useful way. You should use multiple tabs in the spreadsheet for the multiple measurements you made. Avoid keeping all your measurements in one tab – unless you already know how to organise that tab accordingly. The general rule for you should be that one tab holds all the data that you might want to draw in a graph. Also, when you have similar types of data, ensure that your tabs have the same structure or content, so that you can easily modify your data, move it around or reference to the data from other tabs.

Example

Let's assume you are measuring the flow, temperature and electrical conductivity of a stream every month by using the salt dilution method. The data for measuring the flow with the salt dilution

method would go into several tabs, which you might call “Flow Data 2015-04-26” | “Flow Data 2015-05-23” | “Flow Data 2015-06-27” (see image below). Somewhere in those tabs you would have the calculated result of that given’s day flow measurement.

Now you would have another tab, which you might want to call “Monitoring Data” – this would go into one table with the four columns “date”, “flow, L/s”, “temperature, °C” and “electrical conductivity, µS/cm”. The headers of the columns should be in the first line of the spreadsheet and directly thereunder, you would have your data. Avoid combining cells, leave empty lines or empty columns within the relevant data as this avoids you from doing calculations or sorting your data. It’s a good idea to include the units in the table header – don’t write them under the headers.

	A	B	C	D	E	F	G	H	I	J
1	date	flow, L/s	temperature, °C	electrical conductivity, µS/cm						
2	2015-04-26	12,5	23,1	334						
3	2015-05-23	11,9	22,0	368						
4	2015-06-27	13,1	19,8	320						
5										

Graph Monitoring Data | **Monitoring Data** | Flow Data 2015-04-26 | Flow Data 2015-05-23 | Flow Data 2015-06-27 | +

Then you compose a graph of your data in the tab “Monitoring Data”, and at the end you move this graph into its own tab which you might call “Graph Monitoring Data”. Delete all tabs that don’t contain data from your spreadsheet – they might only confuse you – and ensure that you don’t have ‘non-speaking’ tabs such as ‘Sheet1’ or ‘Sheet2’.

Writing about calculations, I need to add that the build in, standard calculator in MS Windows produces some funny results: $4 + 4 \times 4 = 32$ according to the Windows Standard Calculator. Of course, the correct result would be 20. If you want to use the Windows calculator, **always** use the Scientific Calculator, which provides you with the correct result (yes, you can wear your “ $-1.068281969439142e^{-19}$ ” T-shirt now).

When copying a spreadsheet directly from MS Excel, which is not recommended, then insert it into MS Word with Insert > Insert Special > Windows Metafile.

PowerPoint

[there would be much more to say – that’s just the most important]

Possibly, I shouldn’t have started reading Edward R. Tufte, especially “The cognitive style of power point”. Because it is too late now, and reading a book can’t be undone, I need to spend some time thinking about Tufte’s until his words settle. In the meantime, and until I can present you a way around PowerPoint, please keep in mind the following bullet points in PowerPoint Style:

- Only use PowerPoint when you consider it necessary. One of the best scientific talks I ever heard was completely without slides
- Embed all your fonts (<http://bit.ly/PPFontEmbedding>)
- Resize all your figures
- Save your presentation as a PowerPoint Screen Presentation (ppsx)
 - This makes your presentation much more professional when you present
 - PowerPoint itself will not open, just your presentation
- Keep the number of lines on a slide to 10 to 15. More lines are hard to read for your audience

- Avoid light colours such as light yellow or green – often, they can't be seen
- Use shadows only for photographs, not for scatter diagrams
- Avoid using “funny” animations (Tufte calls it PowerPoint Phluff) – stay with ‘wipe’ and ‘appear’
- Use guides to correctly align your elements (or the alignment function)
- The time you need for one slide ranges between 1 and 2 minutes. For a 15 minutes presentation you must, consequently, not use more than about 10 to 15 slides!
- Leave a wide enough, white edge around all your slides, as some data projectors might be mis calibrated and can cut off you valuable information.

Acknowledgements

[never forget to thank those who helped you – please avoid making them co-authors]

These Tips & Tricks would not have been possible without the contribution of so many of my students and colleagues over the years. I say “thank you” to all of them. Special thanks to Bob Kleinmann, Olga Oleksiienko, Catherine Coni, Elke v. Hünefeld-Mugova and Henk Coetzee for proofreading all or parts of this text. I would also like to thank the many online and offline sources I have used to check the accuracy of expressions. Some sections are taken verbatim from Turnitin’s QuickMark® Comment Definition or the ASA-CSSA-SSSA Publications Handbook and Style Manual. Dan Gookin’s writing style inspired me to “try new things” that I hadn’t done in the past – and even though I’ve been using MS Word since 1991, I still learned a lot from his book.

And now I wish you good luck! Don’t be shy anymore when you have your written text in front of you, because you have the right tools to present your ideas beautifully – the content? – Well, that would be for another writing guide.

Finally, with the German miner’s greeting, I wish you “Glückauf¹⁷!”

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[the ones you need to write for me and the ones I used to write for you]

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“The world is a hellish place, and bad writing is destroying the quality of our suffering. It cheapens and degrades the human experience, when it should inspire and elevate.”

Tom Waits in VANITY FAIR (July 2001)

Endnotes¹⁸

[nothing will come hereafter – promised!]

¹ You could argue that Bodoni used the ~-symbol in his *Manuale tipografico II*. (p. 269) with the explanation “*Simile a*”. I agree, but you are writing in 2024 and he published *posthum* in 1818 – you understand?

² The proper name for this symbol would be *octothorpe* – and if you think that is the end of the story, you might want to read Keith Houston’s seventeen pages about this “problem child”.

³ Do you know how the chemical structure of benzene was found? The man who found the structure was the German Friedrich August Kekulé von Stradonitz while he fell asleep in a London coach in summer 1855. He wrote:

“During my time in London I lived for quite a while in Clapham Road, near the Common. However, I frequently spent my evenings at the home of my friend Hugo Müller in Islington, at the opposite end of the metropolis. We spoke of many things, but mostly of our beloved chemistry. One lovely summer day I rode once more, by the last omnibus, through the now deserted streets of the otherwise so lively city, ‘outside,’ on the upper deck of the omnibus, as usual. I sank into reveries [Träumereien]. The atoms began to gambol before my eyes. I had always before seen them in motion, these tiny creatures, but I had never succeeded in discerning the nature of their motion. This time I saw how two of the smaller ones frequently paired off; how larger ones seized two small ones, how still larger ones held three and even four of the tiny atoms together, and how they all moved in a whirling dance. I saw how the larger ones formed a line, and dragged the smaller ones along only at the end of the chain. I saw what the venerable Kopp, my honoured teacher and friend, so charmingly depicted for us in his ‘Molekularwelt,’ but I saw it long before him. The cry of the conductor, ‘Clapham Road!’, awakened me from my reveries, but I spent part of the night committing at least sketches of these dream figures to paper.” (from Rocke, 2010)

This was the birth of the structure theory. It was a dream that revealed the most important structure in organic chemistry. Start do dream as well!

⁴ In the year 2021 the German Benjamin List received together with David MacMillan the Nobel Prize in Chemistry for the development of asymmetric organocatalysis.

⁵ Herbert George Wells is said to have plagiarized parts of Florence Amelia Deeks’ manuscript “The Web of the World’s Romance” (1818, unpublished) in his book “Outline of History” (1919) – which sold millions of times.

⁶ There are nearly 100 different names used for this small, helpful tool developed by Amir Ban, Dov Moran and Oron Ogdan in 1999. I thought it might be worth mentioning.

⁷ Well, the second article was translated into English by C. S. Yogananda for the journal *Resonance* in 2000 (<https://doi.org/10.1007/BF02839006>), to make it accessible to a broader audience, which means that you will find it. However, Durov’s paper is still “hidden”.

⁸ Once I got a scientific manuscript for review, which was completely written in MS Excel. Each line of the text was in one single cell and the whole text in one column. If you want to treat your supervisor badly – feel free to do so as well.

⁹ I used sentences from famous authors of the relevant countries. Here is their meaning in English: “What is your way about religion, pray?” – “Now I don’t really care much anymore” – “Gentlemen, I don’t know what happened to me.” – “Long live all nations” – “What you don’t want done you, don’t do to others.” – “Old pond / Frogs jumped in / Sound of water” – “On the way up towards the hot sun” – ... Javier Ambler, Manuel Ellis, Elijah McClain, Christopher Lowe, Byron Williams, Derrick Scott, Byron Williams – “The time is always right to do right.”

¹⁰ The serial comma (also called Oxford comma, because the Oxford Style Manual recommends its use) is an interesting thing, which you might love or just ignore. It’s up to the Editor-in-Chief’s or your personal preference to use it or not. This comma is added directly before the last ‘and’, ‘or’ or ‘not’ in a list of more than two terms: “I came, saw, and conquered”. It is more common in the US than in the UK (though the name might induce different). What shall you do? Well, let’s simply say it with Lynne Truss (2003): “There are people who embrace the Oxford comma, and people who don’t, and I’ll just say this: never get between these people when drink has been taken.” – you understand?

¹¹ My preferred fonts since about 2010 are the fonts in the “Thesis Font Family” from font designer Luc(as) de Groot ^{Luc(as) de Groot}. This family consists of the “Sans” (did you notice the similarity with the Calibri?), the “Mix” and the “Antiqua”. Yet – you have to purchase them. To ensure that you see what you can do with the fonts distributed with Windows and MS Office, I decided not to use them in this text. Do you want to see why I love them? Here they are (text from “The Letter”, a poem by Charlotte Brontë – thanks, Jana, for introducing me to her literature): What is she writing? Watch her now, how fast her fingers move! * The Sans

What is she writing? Watch her now, how fast her fingers move! ★ The Mix

What is she writing? Watch her now, how fast her fingers move! ★ The Antiqua

¹² “Amarante is an elegant, narrow serif typeface whose allegiances sway between the fluidity of botanical Art Nouveau forms and the vaulted, rigid lines of a gothic cathedral. Its bold, highly stylized forms lend it an air of eccentricity and sophistication, while its tall x-height ensures its readability even at small size.” (www.karolinach.com/amarante.html)

¹³ ISO 8601-1:2019/Amd 1:2022, for details see https://en.wikipedia.org/wiki/ISO_8601

¹⁴ CRediT (Contributor Roles Taxonomy) is a high-level taxonomy, including 14 roles, that can be used to represent the roles typically played by contributors to research outputs. The roles describe each contributor’s specific contribution to the scholarly output. Details can be found on this web page: <https://credit.niso.org>

¹⁵ “A drop penetrates stone not by falling, but by falling many times; thus, a person gets wise not with force but by often reading.” (loosely cited after Giordano Bruno, *Il Candelaio*, 1582, who wrote: “*Gutta cavat lapidem non bis, sed saepe cadendo: Sic homo fit sapiens, bis non sed saepe legend.*”)

¹⁶ I don’t want to touch the general problem of co-authorship. There is a lot of discussion and literature available in the academic world. The pressure to publish and the fact that many research institutions distribute money based on “output” (≙ publications) promotes this behaviour. Unfortunately, it also covers the tracks of the real authorship (the one who literally **wrote**) of a paper. Not too sure what to do? Well, then proceed to this web page with a lot of useful links: <http://teachingcommons.cdl.edu/cdip/facultyresearch/Co-authorship.html>

¹⁷ Visit www.IMWA.info/lagniappe/159-the-meaning-of-glueckauf.html if you want to know the exact meaning of this expression.

¹⁸ I don’t like Endnotes because they make reading a text somehow laborious. However, during writing these lines so many sparks hit my brain that I didn’t want to withhold them from you. Please apologize. For both, the sparks and the endnotes.