MIM workshop: General principles of scientific writing

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Review

- Target your audience
  → Break down concepts, paraphrase, provide examples or use analogies if prior knowledge cannot be assumed
- Write stories not reports
  → Emphasize relevance, clear problem statement, align discussion/conclusion to resolve the problem
- Efficient writing
  → Skeleton/meat/cosmetics
- Effective and coherent writing:
  → Power of position, one topic/one paragraph; start with topic sentence, then elaborate
- Cosmetics:
  →Use stress position as subject (grammar) of next sentence
  →Vary sentence length
- Improve writing by analytical reading
  →Read like a robot (rather than content-focused)

Improve clarity: 10 examples of cumbersome writing

S05xE01 - Ten rules to avoid cumbersome expressions

Please download the file: 3.1-A_guide_to_scientific_writing_Chapter3.pdf

In pairs, discuss two rules (of the 10 in total). After that, present these points to all participants.

1. Cluster of nouns
2. Clusters of adjectives
3. Subordinate clauses at beginning of sentence
4. Nouns derived from verbs
5. Filler verbs / words
6. Passive vs active
7. Use of imprecise words
8. Use of compound prepositions
9. Use of multiple negatives
10. Use of unfamiliar abbreviations, symbols and references

Improve clarity: 10 examples of cumbersome writing

- Cluster of nouns

Example: random leaf copper analysis

→ difficult to read, imprecise; ambiguous assignment of an adjective to the noun(s)

Suggestion:

1) Replace noun
   - Difficult child psychology problem → psychological problem
2) Don't skip propositions
   - Psychological problem of difficult children
3) Hyphenate for clarity
   - Difficult-child psychology problem

- Cluster of adjectives

Example: the maximium net returns above feed-cost ration

Improve clarity: 10 examples of cumbersome writing

- Subordinate clauses at beginning of sentence

  Example: Although there are too few plots to show the interactions […], copper and zinc acted additively

  - Introduction of caveats (Although, while) at beginning of sentence puts focus at the beginning

  → better stress caveats at the end and start with key point (result)

  Except: the caveat is the key point to emphasize

- Nouns derived from verbs

  Example: Low temperatures cause a reduction in the rate of reaction

  → Replace nouns with verbs: Low temperatures reduce the rate of reaction

Improve clarity: 10 examples of cumbersome writing

- Filler verbs / words

Example: we conducted a study of pathogenic insects

- Appropriate verb: to study, but used as a noun

Better: We studied pathogenic insects

Prevalent filler verbs: “to occur”, “to be present/noticed”, “to obtain”, “to take”, “to perform”

- Passive vs active

- Generally use active voice: more clear, easier to read
- Passive: removes **accountability**; use if method is irrelevant who did it

Improve clarity: 10 examples of cumbersome writing

- Use of imprecise words

Example1: considerably, quite, somewhat (are all non-quantitative)

Example2: etc.

- use if it's clear (I labeled the tubes 1, 2, 3, etc.)
- don't use if it's not clear (mice were checked for temperature, weight, etc.)

- Use of compound prepositions

Example: in the case of, in order to, as to whether,

- If not needed, don't use padding words; change to shorter alternative if available

Improve clarity: 10 examples of cumbersome writing

- Use of multiple negatives

Example 1: it is not uncommon → it is common

Example 2: it is unlikely that it won't work → it is likely to work

- Use of unfamiliar abbreviations

  - don't use unfamiliar abbreviations in titles or title of figure legends

  - if an abbreviation is not used more then 2-3 times, don't abbreviate to maintain flow of reading

  - mind background of readership as abbreviations may have different meanings depending on the field

Report writing - practice

S06xE01 – Structuring (before writing) a scientific research article

Please open the file "4-Draft_manuscript.commented.docx" and make suggestion how the paragraphs could be improved by making use of what you learned so far, including:

- Concise writing: as short as possible, but as much as needed to understand content
- Abstract writing
- Problem statement including consequence if not addressed
- Forward-looking discussion rather than summary of results
- Power of position to improve coherence
- Resolve cumbersome writing (previous exercise)
    - avoid subordinate clauses

Edit the document by making suggestions, pointing out missing information, and importantly being constructive!

Cognitive / competence levels

Cognitive level / K-level
K1 (Remember)
K2 (Understand)
K3 (Apply)
K4 (Analyze)
K5 (Evaluate) (Expert Level only)
K6 (Create) (Expert Level only)

K1/2:
Throughout the course, you were shown and understood new concepts/tools.

K3/4:
You applied the tools by analyzing given examples and a draft manuscript. You made corrections / constructive suggestions.

K5/K6:
The final task is to use your newly acquired competences to create something new, that is: your scientific report.

Report writing - practice

S06xE02 – Start structuring your report

Use abstract (draft or bullet points) as “skeleton” for your report

- **Introduction**
  - **Paragraph 1: background, state-of-the-art**
  - **Paragraph 2: focus on specific topic**
  - **Paragraph 3: problem statement**

  Writing tip: end paragraphs with statements (e.g., “However, “) that foreshadow what your results will address
- **Results**
  - **Section header 1 = message 1**
  - **Section header 2 = message 2**

  Writing tip: Start a paragraph with “To [test/determine/etc. xyz…], we [did/performed/etc. abc…]”
- **Discussion**
  - **Paragraph 1: message 1 in context of original problem/question**

  Writing tip: Use forward looking sentence structures “Our finding that […], validates/complements/contradicts“
- **Figure:**
  - **Legend: what does the figure tell us (rather than describing what the reader looks at)?**

Resources

This course - https://sunagawalab.ethz.ch/MIM_SW/HS-2024/

Books

- "A guide to scientific writing", David Lindsay (basic)
- "The craft of research", Booth et al (intermediate) → focus on scientific process / practice
- **"Writing Science", Joshua Schimel (intermediate) → focus on story telling**
- **"Scientific Papers Made Easy" (intermediate) → focus on clarity and impact**
- "Style", Joseph M. Williams (advanced)

Example online resource for scientific writing:

- https://www.aje.com/en/arc/

Assignment

- Research report **due on 20. September 2024**
  - send by email to:

  ssunagawa@ethz.ch and asintsova@ethz.ch

- max. 1,500 words, 1 fig and/or 1 table
  - include citations, but no bibliography needed

- You will receive your certificate upon receipt of report