Publish in Style: Writing a Full Paper

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WHO WE ARE

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CONTENT

- Title and abstract
- Introduction of the paper
- Materials and methods
- Discussion and conclusions
- Selecting the journal
- Summary
Title and abstract
Why

‘The effect of heating the albumen and vitellus of the Gallus Gallus Domesticus contained in calcium carbonate in $H_2O$ to $373.15 \, K$’

when

‘Boiling a chicken egg in water’ says it?
Use the title to decide on the direction of your paper
COMPARE TITLES – SAME PAPER

1. Qualitative analysis of emerging micropollutants in Malaysian wastewater treatment plant system

2. Qualitative analysis of emerging micropollutants – case studies from wastewater treatment plant systems in a tropical country

3. Emerging micropollutants – applying qualitative analysis in wastewater treatment
COMPARE TITLES – SAME PAPER

1. Modeling pressure – leakage response of water distribution systems using the FAVAD equation

2. Modelling pressure – leakage response of water distribution systems considering leak area variation

3. Modelling pressure – leakage response considering leak area variation
COMPARE TITLES – SAME PAPER

1. Review on the development of capacitive deionization for water sources with low total dissolved solids
2. Review of capacitive deionization for low salt concentration water sources
3. Capacitive deionization for low salinity water desalination – a comparative review
SOME PUBLISHED TITLES

- Performance and productivity measurement of urban water supply services in India
- Hydrological and environment tritium investigation to evaluate groundwater in capital territory of Pakistan
- The energetics landscape of ADM1 calls for a revision of VFA degradation and kinetic parameters
- Performance Evaluation of Graphene coated Polyethylene Membranes for the treatment of Reverse Osmosis Brine Reject using Membrane Distillation
- Novel Method of *E. coli* Detection Showing Quantification between 1 - 100 cfu/ml (colony forming unit)
- Geophysical approach to groundwater resource evaluation in the semiarid highlands of Bolivia
THE TITLE – CATCHING THE ATTENTION

- As **short** as possible – but still informative!
- The title ”sells” the manuscript – should spell the message of the paper
- Express **only one idea or subject** in the title
- Important words are placed first – begin with words that attract the reader
- No abbreviations or jargons
- **Subtitle** can be useful
A REVIEW PAPER

- A review paper is more than a literature study.
- An in-depth critical discussion is essential for acceptance of a review paper.
  - Provides new insights or interpretation of a subject
  - Relies on previously published literature
  - New data from the author’s experiments are not presented
  - Usually expected at least one experienced senior researcher
ABSTRACT

- Make sure that the abstract is informative, can stand alone and covers the content

  - A combination of
    - The problem
    - The conclusions

- It is the selling point via search machines—be brief and specific.
  Use < 200 words

- No figure and no reference
KEYWORDS

- Use 3-6 descriptive keywords
- Be precise - avoid general keywords like "wastewater treatment process"
- Keywords and the title are used for searching for papers
  (the words of the title should not be repeated as keywords)
TOP 10 HINTS FOR ABSTRACT WRITING

1. The title: summarize your paper in one sentence

2. Stand in the readers’ shoes

3. Outline three central points of your work

4. Literature review and research gaps are important

5. The key points of your contributions

TOP 10 HINTS FOR ABSTRACT WRITING

6. What are the results?
7. Value of your work
8. What remains to be solved in the future?
9. Complete your story
10. Ask non-expert readers to read it

Xiaoyuan Zhang & Gustaf Olsson. IWA. 2018.
http://www.iwa-network.org/top-10-hints-for-abstract-writing/
2-minute presentation of your paper
Introduction
(of your paper)
EARLY IN YOUR WORK

- What is the vision of the research?

- The Problem: the question to be addressed

- The Hypothesis: suggested solution to the problem
INTRODUCTION (1)

- Early in the project:
  Sketch the introduction to clarify your thoughts

- After the whole paper is finished: Complete the introduction!
INTRODUCTION (2)

- **Early in the introduction!**
  - State the purpose of the paper
  - The research question to be asked

- **Then comes the background**
  - Why did you do the work
  - Earlier work, literature review

- **The literature review:**
  - Gives motivation for the research
  - Do not repeat general knowledge – your paper is not a textbook!
  - Quote *only* publications with direct bearing on the problem
  - Don't review all studies that have ever been published on the topic
INTRODUCTION (3)

- **Finally**: State your hypothesis – suggested solution to the problem
  - Give the big picture of the results
  - Overview of the paper

- *Remember*: by reading the introduction the reader will decide if he/she will continue to read the paper
ABSTRACT + INTRODUCTION

Give the abstract + introduction to a colleague or friend (one who is not a specialist)

Ask him/her whether it makes sense.
Materials and methods
MATERIALS AND METHODS

- The research should be possible to verify by anybody else
- **Describe** the methods
  (not only “I used the software XYZ and found…”)

Always a balance between **brevity**
(cannot describe every technical issue)
and **completeness**
(the reader has to understand what happened)
MATERIALS AND METHODS – HOW TO BEGIN

- This is now about HOW you did it.
- Start with a few paragraphs that will qualitatively describe how you approached the problem.
- This will prepare the reader to better understand the details of the experiments, simulations or analysis methods.
Results
RESULTS (1)

Show only the experimental results that are relevant to your objectives and conclusions and which you intend to discuss.
RESULTS (2)

- Try to describe the results *qualitatively* in a paragraph before you present the numbers
- Be very careful with *statistics*! Before any analysis, look at the data and *try to find out qualitatively what the data tells you*
- The data should lead you to the conclusions
RESULTS (3)

- If you can summarize the results in a *figure*, do that! Remember – there is usually space only for 2-3 figures!

- *Tables* are useful, but should not be too long or too detailed – only the key results

- Details of the results can be published on a website or in an internal report.

- Sometimes you may also present the raw data in an appendix
FIGURES ARE IMPORTANT!

- Remember – an informative figure can replace many words
- Try to catch the whole message of the paper in 1-2 figures!
- Explain nomenclature in the figure or in the figure caption.
FIGURES AND TABLES (1)

- Remember: the paper will probably be printed in black/white
- Do not put too many details in the figure or in the table – it should be easily readable!
- Have an informative caption (do not repeat information)
FIGURES AND TABLES (2)

- Design each table and figure to be understandable on its own, without reference to the text.
- Organize the tables and figures in such an order that they tell a story.
HOW TO PRESENT IN B/W?

Source: Agbaje et al., Masdar Institute
DO NOT MAKE IT TOO COMPLEX!
COMPARISON OF REMOVAL RATES
SCALING IS IMPORTANT!
“COD and BOD removal was (were!) 79.26% and 97.17%, respectively”
UNCERTAINTY PRESENTATION

- Use minimum number of significant digits:
  - $23 \pm 7$ correct
  - $23.4 \pm 6.6$ not correct
  - $23.4 \pm 0.6$ correct

- Use the symbol $\sim$ to mean: approximately equal to

- Put *space* between numbers and units:
  - Ex: 75 kg. Exception: 75%
DATA QUALITY

- You always have to check the quality of your data!
- Outliers or not?
- Compare different measurements
  - Flow rate versus concentration
  - Does a peak in one variable correspond to a peak in another variable?
  - Negative concentrations?
  - Zero value or missing value?
- Standard deviations: how many values?
Discussion and conclusions
DISCUSSION

- Discussion is the heart of the paper – be careful to present the results clearly
- The main function is to answer the questions posed in the Introduction
- It is not sufficient to present the results. Try to explain them!
- Explain and discuss results that may be surprising!
- Edit, edit, edit….
CONCLUSIONS (1)

The conclusion

✓ is the “take-home” message of the paper!
✓ short, concise statements of the results
✓ must be possible to derive from the results and discussion
✓ will show the reader how successful you were
CONCLUSIONS (2)

The conclusion

✓ *is not* an extension of the discussion
✓ *is not* a summary of your paper
✓ *has no* references!
✓ will also show implications for future research
AND FINALLY…

- Revise, revise …
- Ask colleagues to review before you submit
- Find an experienced writer to check the language
- Ask if your friend (who is not a specialist!) can understand the introduction
- Revise again!
Selecting the journal
CHOOSING WHICH JOURNAL TO SUBMIT YOUR PAPER TO

- Review the aims and scope
  - Ensure compatibility

- Read carefully the instruction for authors
  - Ensure compliance

- Impact factor
  - Does it meet your expectations?
  - Usually: higher impact factor → higher rejection rate
ACCEPTANCE RATES

- Have a realistic expectation of acceptance

Acceptance rates and IF (2019):
- *Water Research*: 20%, IF = 7.91
- *Water Science and Technology*: 24%, IF = 1.62
- *Journal of Water and Climate Change*, IF=1.01
- ACS – *Environmental Science & Technology*. IF=7.15
- Elsevier – *Journal of Membrane Science*, IF=7.02
- Elsevier – *Desalination*, 27%, IF=6.04
- Springer – Frontiers of Environmental Science & Engineering. IF=3.88
OPEN ACCESS JOURNALS

- Open access in publishing has gained huge importance over the last years.
- Today many funding agencies request that research results are published free of all restrictions to (online) access.
- By paying a certain charge, papers are made available immediately to the public.
- Typical Article Processing Charges: US$500 - US$5,000
IMPACT FACTORS

https://clarivate.com/products/journal-citation-reports/

Do not look at impact factor of the journal only. Look at the **aims and scope** of the journal so that you **reach the right audience**. This has a higher probability of **impact**.

The Best journals are not necessarily the ones with the highest impact factor.
Summary
TOP 10 HINTS FOR FULL PAPER WRITING

1. The title “sells” your paper
2. Abstract: first impression of your paper
3. Keywords help improve the discoverability of your work
4. Introduction: what is known and what is unknown?
5. Materials and methods: key description of what you did and how you did it

Xiaoyuan Zhang & Gustaf Olsson. IWA. 2019.
6. Results and discussion: the heart of the paper

7. Conclusion: what is remembered most about your study

8. Select your target journal: higher impact factor or higher impact?

9. References

10. Revise, revise, and revise!

Xiaoyuan Zhang & Gustaf Olsson. IWA. 2019.
THANK YOU

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