

Specialised scientific communication

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Overview

- 1. The purpose**
- 2. The research article**
- 3. The audience**
- 4. Parts of the manuscript**
- 5. How to write a paper**
- 6. Publishing**

1.The purpose

- Communication of good ideas medium through which science progresses

Why do we write ?

- To communicate an **idea** to people

An idea can be:

- a new way of looking at objects (a “model”)
- a new way of manipulating objects (a “technique”)
- or new facts concerning objects (“results”)

2. The research article

The key to good papers:

- Full awareness of the role of papers
- Full awareness of the audience
- Precision, clarity and economy

Steps to good papers:

- Identify the key ideas
 - can you describe the study in 1 or 2 minutes?
- Identify the relevant community
 - experts working in the area
 - current and future researchers, graduate students
- Present these ideas to the relevant community

Writing, style and level appropriate:

 - to the audience (conventions of a field)
 - to the journal (instructions for authors)

3. The reader

Readers’ needs vs. writer’s desires:

- The “Checklist” Phenomenon
- Obscure Generality
- Meaningful special case first
- Avoid Idiosyncrasies
- Lack of Hierarchy/Structure
- Discussion of possible criticism comes last

How to serve the reader’s needs

- To present **clearly** the new ideas in each level of the writing process:
 - Overall structure of the paper
 - Single paragraphs
 - Sentences
 - Choice of phrases
 - Terms
 - Notation

Some concrete suggestions:

- Apply good principles to the concrete dilemmas
- Special attention to order and **organization**
- **Flexibility** on the application of judgment
- Not to follow a canonical example or structure

4. Parts of a manuscript

- a) - title
- b) - list of authors
- c) - abstract
- d) - introduction
- e) - main part (methods, results, discussion)
- f) - acknowledgements (optional)
- g) - references
- h) - appendices (optional)

Section of Paper

Experimental process

Abstract

What did I do in a nutshell?

Introduction

What is the problem?

Methods

How did I solve the problem?

Results

What did I find out?

Discussion

What does it mean?

Acknowledgements

Who helped me out?

References

Whose work did I refer to?

Appendices

Extra Information

Write in what order?

Write:

Title

Methods

Results

Introduction

Discussion

Abstract

Acknowledgements

References

Present:

Title

Abstract

Introduction

Methods

Results

Discussion

Acknowledgements

References

a) Title

Will determine whether paper gets read

- Use descriptive words for content (electronic searches)
- As informative as possible
- If possible, give the key result of the study
- Not too cumbersome or too long (see journal rules)
- Avoid abbreviations
- Will probably be written earlier, but is often modified

b) List of authors and affiliations

- Alphabetical order
- Contributions to the work
- Researchers rank

c) Abstract (I)

- Last section written
- Critical part of paper
- As informative as possible
- Not too cumbersome or too long - not exceed 200 words
- Concise summary of the entire paper

c) Abstract (II)

- State main **objective**
- Brief description of the **methods**
- Summarize most important **results**
- State major conclusions and **significance**
- Should be **self-contained**

c) Abstract (III)

- Need not motivate the model
- Need not list and/or recall the contents of prior work
- Need not provide an accurate description of the results
- Should not contain references
- Should not contain any sort of illustration
- Avoid acronyms

Bear in mind:

- helps readers decide whether they want to read the paper
- useful to someone who may want to reference your work
- the abstract is all that may be available to some readers

This format allows the paper to be read at several different levels

Strategie:

To begin composing your Abstract, take whole sentences or key phrases from each section and put them in a sequence which summarizes the paper

Write and rewrite until flawless

d) Introduction (I)

- Purpose – hypothesis, question or problem
- Clear description of the work
- Rationale – good motivation - not from scratch
- Comparison to prior works – review of the published literature
- Clear description of the contents
- Clear statement of the main results
- High-level description of the techniques

d) Introduction (II)

- Highlight important new ideas
- Important conclusions may also be stated
- Inverted triangle structure

The introduction must answer the question:

- *What was I studying?*
- *Why was it an important question?*
- *What did we know about it before I did this study?*
- *How will this study advance our knowledge?*

e) Main part

□ Materials and methods

- To provide insightful discussions of the definitional choices
- Best to begin writing when experiments still in progress
- Should be detailed enough so results can be repeated by others
- Reference published methods where appropriate
- Use descriptive subheadings
- Methods section is not a step-by-step, directive protocol
- Statistical software used

□ Results (I)

- Has both text and illustrative materials (tables and figures)
- Each Table and Figure must be referenced in the text
- Numbering technical elements
- Tables and figures must be straight forward and concise
- Present main findings referring to tables/figures

□ Results (II)

- Do not speculate or over discuss results
- Highlights the answers to the questions/hypotheses
- Important negative results should be reported too
- Do not interpret data here
- A statistical analysis is not the scientific result but a methodological tool

□ Discussion

- First answer question posed in introduction
- Do not introduce new results in the Discussion
- High-level material that better fits after the main part
- Explain what is new without exaggerating
- Discuss weaknesses and discrepancies

□ Conclusion

- Do not repeat results
- Relate your conclusion to existing knowledge
- Conclusion/summary, perspectives, implications
- Suggestions for further work

f) Acknowledgments

- Each person with whom the author had a relevant discussion
- Authors usually acknowledge outside reviewers
- Are always brief and never flowery
- Placed between the Discussion and the References

g) References

- Do not label this section "Bibliography"
- Alphabetical listing by first author's last name of the references cited in the body of the paper
- Relevant and recent
- Be highly selective
- Use correct style for journal

h) Appendices

- Optional
- Contains information that is non-essential
- Each Appendix should be identified by a Roman numeral in sequence
- Material: specialized computer programs, full names of abbreviations

5. How to write a paper

- Use stylebooks
 - manuals of accepted rules
 - how to create a draft
 - focused on rewriting
- Avoid writing mistakes

Common writing mistakes

- Cumbersome notations and terms
- Sentences with complex logical structure
- A labyrinth of implicit pointers: “it” and “this”
- Mixture of mathematical symbols and text
- Abuse of words where fewer will do
- Abuse of 'the'

Do not do the following

- Do not use colloquial speech, slang, or "childish" words
- Do not use contractions - "don't" must be "do not"
- Do not use footnotes
- Do not use direct quotes
- Watch out for wordy phrases

Writing suggestions:

Writing and thinking are closely linked

"fuzzy writing reflects fuzzy thinking"

- **Use an outline to organize your ideas and writing**
 - figuring out what you want to say
 - planning the *order* and *logic* of your arguments

6. Publishing

Why write and publish research

- Ideally
 - to share research findings and disseminate knowledge
 - hope of improving scientific progress

- Practically
 - to get funding
 - to get promoted
 - to get a job
 - to keep your job!



“Scientists are rated by what they finish, not by what they attempt”

- ‘Publish or perish’ (what to publish)
- Impact factor (where to publish)
- The ‘Matthew Effect’ (with whom to publish)

Getting a paper published

- Competition for space in journals is intense
- Cost of publication
- Rejection rates vary
 - Science, Nature = 90%

Major reasons for rejection:

- Confirmatory (not novel)
- Poor experimental design
 - Poor controls
 - Hypothesis not adequately tested
- Inappropriate for journal
- Poorly written

Tips:

- Know the journal, its editors, and why you submitted the paper there
- Make sure references are comprehensive and accurate
- Read and conform to “Instructions for Authors”

Publish and perish

- Data manipulation, falsification
- Duplicate manuscripts
- Redundant publication
- Plagiarism
- Author conflicts of interest

What constitutes redundant publication?

- Data in conference abstract? **No**
- Same data, different journal? **Yes**
- Data on website? **Maybe**
- Data included in review article? **Ok, if later**

What makes a good research paper?

- Good science
- Good writing
- Good journals

What constitutes good science?

- **Novel** – new and not resembling something formerly known or used
- **Mechanistic** – testing a hypothesis - determining the fundamental processes involved in or responsible for an action, reaction, or other natural phenomenon
- **Descriptive** – describes how things are but does not test how things work – hypotheses are not tested

What constitutes a good journal?

- Impact factor – (JCR)
 - average number of times published papers are cited up to two years after publication

- Scimago journal Rank – (SJR)
 - based on the transfer of prestige from a journal to another, as expressed in citations a journal gives to other journals and to itself

Help in choosing the journal

- read references
- get insight into possible reviewers
- study “instructions to authors”
- check the SJR and Impact Factor

<http://www.scimagojr.com/>

Submission

- Read instructions carefully
- Fill out all necessary forms
 - Copyright transfer
 - Conflict of interest

Responding to reviewers

- Carefully prepare your responses
 - Be enthusiastic
 - Each comment should be addressed
 - Each change should be stated

- Reviewer may be wrong
- Be tactful – thank the reviewers
- Do not respond to reviewers while upset
- Never call the editor
- Get help from other authors

Remember:

Strive for simplicity whenever possible

“Those who have the most to say usually say it with the fewest words”

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“Specialised scientific communication”

*“There is no way to get
experience except through
experience”*