



Scientific writing

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- To enable **beginning researchers**/writers to have the well-founded confidence to **submit their scientific articles** to impact factor **journals** and **complete dissertations** that will pass first time.

Objectives

- **To enable participants to:**
 - Apply the skills of **good** scientific essay **writing**; argument and evidence, clarity, brevity, structure, flow, coherence;
 - Write compelling **introductions**, **conclusions** and structured **abstracts**;
 - Write a research paper using the **AIMRDC** structure.



Publication strategy in geography

- **„scientometry“ – all around Europe.**
- **Even for PGS**
- **Connected with – accreditation and department future.**
- **Why is this relevant for Ph.D. students??:**
- **Dissertation thesis – monograph x article series (+ intro + conclusion).**
- **Money talks – Specific research, category A for IF and Scopus publications (15 – 45 K).**

How to ...?

- **Quality vs. quantity**
- **No points – conference proceedings (work in progress, discuss the preliminary results), journal (CZ + EU).**
- **Minimum – SCOPUS journals (AIMT, Annals of GIS, ...)**
- **WoS – journals with IF**
- **Geography (67 journals indexed on WoS).**
- **Multidisciplinary research.**



Impact and readership.

- Impact factor (ISI-Thomson Reuters)
 - mean annual citations per article in most recent two years following publication. i.e., in 2010 and 2009 for 2008 papers.
- *Nature* IF = 34
- *Current Biology* IF = 10
- *Pest Management Science* = 2.2
- *Crop Protection* IF = 1.3



Where do I start?

Research idea????

Is it novel/original? → In a big or small way?

Check Literature/Discuss with colleagues/Peers

Reference data bases
(Web of Science/Science Direct/PubMed
Google Scholar/Infoseek/Journals/etc)

Can the “research” be carried out by you?

Nature of research



Laboratory based:

Literature/survey based

If something's worth doing – its worth doing properly.

Can the “research” be carried out by you at your institute?

What are the requirements:

- i) Scientific expertise
- ii) Available facilities /resources
(equipped laboratory + computing)
- iii) Time frame (make a GANNT chart)
- iv) Group project/collaborations through networks
- v) Multi-disciplinary teams
- vi) Collaborative approach
- vii) Management/end goals
- viii) Financing – increasingly the driving force.



Key Elements of Good Scientific Writing (Kathleen Fahy)

- Have an argument: (hypothesis, thesis)
- Use evidence to support your argument
- Achieve **clarity** & **brevity** with:
 - careful and consistent **word choice**
 - short sentences with **subject first**
 - Clear and logical **structure**, flow
 - Coherence and avoidance of extraneous ideas or data.

Word Choices

- **Accuracy**
 - Define your key terms
 - Choose precise words and **use the same word consistently** each time
- **Brevity**
 - Use the fewest words possible
- **Clarity**
 - Use simple words so that an educated reader can understand you

Accuracy in Word Choices

| Word | Definition | Example |
|--------------------------|---|---|
| Affect (noun) | To act upon or to influence | The environment negatively <i>affected</i> the wellbeing |
| Effect (verb) | The result of a cause | Failure to progress is an effect of an epidural |
| Practise (verb) | To do repeatedly in order to gain a skill | The <i>practise</i> of midwifery |
| Practice (noun) | The exercise of a profession | Midwifery <i>practice</i> |
| Its (possessive pronoun) | Its, like hers and his, does not have an apostrophe | Nursing has <i>its</i> problems |
| It's (contraction) | It's = it is | <i>It's</i> a lovely day today |



Simplicity in Word Choices

| Poor Word Choices | Better Word Choices |
|-------------------|---------------------|
| Utilised | Used |
| Acquired | Got |
| Ascertained | Made sure |
| Subsequent | Next |
| Voluminous | Large, full, big |
| Remainder | Rest |

Scientific Sentences

A sentence is a group of words about a single idea, which contains a least one subject and at least one verb. **SVOMPT (word classes).**

Scientific sentences are short. The subject of the sentence comes first.

Write Short Sentences

Poor Sentence

When tobacco smoke is inhaled it takes 10-20 seconds for nicotine to be delivered to the central nervous system via the arterial circulation.

When tobacco smoke (not the main subject) is inhaled it takes 10-20 seconds for nicotine to *be delivered* (passive verb) to the central nervous system via the arterial circulation.

Improved Shorter Sentence

Nicotine (main subject) takes 10–20 seconds to *reach* (active verb, simple language) the brain after inhalation.

Use Active (not passive) Voice

- In the active voice the subject names the actor

Example: Passive

- Participants under aged 14, who did not get parental consent, were not recruited.

Improved: Active

- *I decided not to recruit participants under age 14 unless they had parental consent.*



Characteristics of Good Paragraphs

Paragraph begins with a topic sentence (i.e. the main idea) and the paragraph has:

- **Unity:** Each sentence is on the topic of the paragraph.
- **Coherence:** The relationship between the sentences is clear and logical.
- **Development:** The main idea of the paragraph is well supported with specific evidence, examples and details.
- **Length:** Paragraphs should be a minimum of 3 sentences



What is wrong with this paragraph?

Women who have an episiotomy more frequently report painful intercourse and marital problems six months after birth. Compared to women who had a 1st or 2nd degree tear, episiotomy is associated with higher rates of perineal trauma in subsequent births. Episiotomy is associated with long-term morbidity. Urinary incontinence is preventable.

Problems:

- Topic sentence is 2nd last
- Last sentence is not related to the topic of the paragraph

Improved Paragraph

Episiotomy is associated with long-term morbidity.

Compared to women who had a 1st or 2nd degree tear, episiotomy is associated with higher rates of perineal trauma in subsequent births. Women who had an episiotomy were more likely to report painful intercourse and ongoing marital problems six months after birth.

Better because:

- Topic sentence first and gives overview
- Supporting sentences give detail and support
- All sentences relate to the topic sentence



Generic Structure of Scientific Paper: AIMRDC

- **Abstract**
- **Introduction**
- **Methods**
- **Results**
- **Discussion**
- **Conclusion**

Title and Keywords

References

1. ICMJE (2013) Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. Available at: www.icmje.org Accessed September 8th, 2013.
2. Cargill, M. O'Connor, P. (2009) Writing Scientific Research Articles: Strategy and Steps. Wiley-Blackburn. West Sussex, UK

- Titles contain key words.
- Some are more important than others.
- Place key words near the start of the title
 - makes it easier for reader to determine what paper is about.
- Insert searchable keywords in your title.
- This makes it easier for your work to be found using web-based engine.

Compare – word search

- Interim Technical Report on progress from the **ADAPPT project**.
- Optimising use of **Pesticidal Plants** against **cattle ticks** and **maize pests** in **Africa**: ADAPPT Project interim report.

Compare – different titles (journal specific)

- Fat Rats: What Makes Them Eat?
– *New Scientist*.
- The role of Luteinising Hormone to Obesity in the Zucker Rat
– *Journal of Neuroendocrinology*
- Rats hold the key to a gorgeous body.
– *The Daily Mail*.

- opportunity to add words used by indexing and abstracting services.
- They are often but not exclusively additional to those in the title.
- Helps others find your work and cite it.
- **All research quality now determined by citation indices.**

Research Abstracts

- **Background (context)**
 - **Purpose (aim or question)**
 - **Methods (participants, setting, data collection and analysis)**
 - **Results (main findings, statistical significance, effect size)**
 - **Discussion/Conclusion (clinical significance, recommendations, limitations)**
-
- **Abstract must accurately reflect the content of the article**



Elements of Effective Introductions to Research Articles

Write in a way that Takes to Reader from General to Specific, from the Known to the Unknown.

1. Problem and broad context for present study
2. What is already known
3. Need for present study made clear
4. Purpose/Aim or Question for present study
5. Define key terms
6. Optional justification for the present study

!Cite only directly relevant research. Do not report data or results from present study!

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Methods Section of Research Paper

- **Purpose:** to demonstrate that the **methods** were scientifically **rigorous** and thus give confidence that the **results** of the study are **credible**.

Methods Section (Generic)

Statistical Methods

- Describe in enough detail for reader to be able judge credibility
- **Reference** credible sources for **methods** of collection and analysis
- Define statistical **terms**, abbreviations, and most symbols
- Specify the **statistical software package(s)** and versions used
- When possible, quantify findings and present appropriate indicators of measurement error (e.g. confidence intervals)

Results (Generic)

- Only report **results relevant to the hypothesis/question in your Introduction**
- Data are facts (numbers); they cannot stand alone
- Most data belong in figures, graphs and tables
- Statistics belong with data and therefore should (mostly) be in the figures, graphs and tables
- Present data after stating the results they support.
- Results are the meaning of the data; they must be stated

Results (Generic)

- **Emphasize only the most important results in text**
- **Put supplementary materials in an appendix (online)**
- **Give numeric results, not just derivatives (e.g. parentages)**
- **Specify how derivatives were calculated, and their statistical significance**
- **Restrict tables and figures to those needed to explain the argument**
- **Use graphs as an alternative to tables; do not duplicate data.**

Discussion/Conclusion

- **Purpose:** “To emphasise the **new** and important **aspects** of the study and the **conclusions** that follow from them in the context of the totality of the best available evidence”.
- Briefly summarise the main findings
- Then explore possible explanations
- Then compare and contrast your results with results from relevant studies
- Link the conclusions to the aim/s of your study
- Make recommendations (research, practice, theory)

- Ensure that the **formatting** of the citations in the text and reference list conform with the style of the journal your article will be sent to.
- This really bugs editors – get it right!
- Laziness here could tempt a referee to assume laziness elsewhere in carrying out the work or even collating results.
- Every part of your written work gives an impression of your overall scientific quality.
- **Quote your colleagues (Citation Index – H) – if relevant!**



Non native speakers specifics

- **Direct English writing vs translation**
- **Carefully consider the quality!**
- **Proofreading:**
 - Grammar and overall legibility
 - Terminology (content specific)

Reviewign process

- **Time consuming (1 year +)**
- Reviewer Blind Comments to Author:
 - Please include specific, detailed comments regarding the originality, scientific quality, relevance to the field of this journal, and presentation. Check the need for tables and figures, and the adequacy of the references.
- **Acceptance (with minor/major revision, reject...)**
- **Even negative reviews can help!**
- **Do not hesitate do re-submit!**



Main Reasons Articles Rejected

| PROBLEM | SOLUTION |
|--|---|
| Novelty not explained | Show how your results are different from current knowledge |
| Results not explained | Make the meaning of results clear |
| Too many results | Focus on main results – remove others |
| Communicates only to a specialist audience | Communicate to an audience including students and journalists |
| Misuse of abbreviations | Do not use abbreviations |
| Does not conform to journal requirements | Follow the guide for authors to the letter |
| Outside the scope of the journal | Select the correct journal by reading Aims and Scope |
| Poor English | Use a professional English editor |

Good Writing is Hard Work

- Experienced, well published authors still take weeks and months to write and refine their papers.
- Expect 10-20 drafts to be written before achieving an appropriate quality 😊