HOCHSCHULE RHEIN-WAAL
Rhine-Waal University of Applied Sciences

LIFE SCIENCES

Guidelines for writing a scientific paper

Wichern, Florian / Watson, Conor / Darr, Dietrich / Schmidt, Rüdiger

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Format

- ***Format:***
  Font: 12 pt Arial
  Line spacing: 2.0
  Margins: 2.5 cm (Top, bottom), 3.0 cm (left, right)
- ***Units:***
  Use SI units,
  e.g. http://physics.nist.gov/cuu/index.html
  or: http://www.ptb.de/cms/en/presseaktuelles/si-basiseinheiten/das-si0.html
- ***Nomenclature:***
  Use scientific nomenclature: e.g. µg g^{-1} soil

Scientific Writing

The structure in which a scientific report is presented:

***Title**; a subtitle should specify the module for which the paper has been elaborated*

Rhine-Waal University of Applied Sciences

Faculty of Life Sciences

Sustainable Agriculture

Authors

Date

Abstract

This is a "mini" version of your report (comprising introduction, objectives, methods, results, conclusions) not exceeding 250 words. Abstracts are normally only provided in scientific papers and theses, not necessarily in small research papers.

1. ***Introduction**, including Literature Review and Objectives of the paper*

    - The introduction provides the reader with the background to your investigation. Ideally it describes a problem or a "gap" in scientific knowledge. Alternatively it can also explain your motivation to study a particular question.
    - The literature review puts your investigation in the context of modern science. Here you should **briefly** summarise the findings of researchers who have carried out work relevant to yours **without** repeating their methods etc. in detail. The literature review can also be used to derive hypotheses for your investigation. If you have formulated hypotheses, they should also be stated in this section.
    - The **objectives** of your investigation should clearly be stated here. What do you want to find out? Which concrete question(s) do you aim to answer? Your objectives **must** complement your conclusions. Each of your conclusions should correspond with one objective. For this reason, although objectives are presented at the end of the introduction, they are often written **after** the conclusions have been written!

2. ***Materials and Methods***

    - This section precisely explains **how** you have conducted your investigation and collected your data, in order to allow other scientists to replicate and validate your work.

- For investigations in the field of natural sciences and technology this often includes treatments, design, apparatus, and data collection.
    - If you have followed a published method, you need only refer to the method and detail any modifications you carried out
    - Provide background information on sampling sites (location, time of year, weather conditions etc.)
- For studies in the social sciences this may include a description of the study area and why it has been chosen, research tools, questionnaire design, data sampling approach, etc.
- In this section you also need to provide details of how you analysed your data (e.g., software used, statistical tests performed, etc.)

3. Results

- This section presents the findings of your work. Language should be clear and concise. Repetitions and unnecessary "filler words" should be avoided.
- In this section, the findings of your work should be described but **should not yet** be interpreted or discussed in detail.
- Besides in the text, major results can also be presented in tables and figures. The reader should be able to understand the content of any table/ figure by reading its title **without reading any other text**.
- "Unnecessary" data (e.g. calibration graphs) should be put in an appendix.
- Formatting of tables and figures should adhere to the following standards:
    - Titles are placed at the top of tables and at the bottom of figures
    - Units must be provided correctly and in accordance to the standardized Systeme Internationale (SI).
    - Figures should have clearly labelled axes (including the units). Error bars should be provided if useful to improve the understanding
    - Tables should indicate levels of significance of data presented. If useful to improve the understanding, standard errors or least significant differences should be indicated

4. Discussion

- This section provides an interpretation of your results. For studies in the social sciences it is not uncommon to merge the "Results" and "Discussion" sections into one.
- Explain relationships and generalisations supported by your data. Draw particular attention to statistically significant differences in your results.
- Relate your results to the findings of other researchers mentioned in your literature review.
- If you have formulated hypotheses, you should also compare the results with your initial hypotheses.
- Properly address difficulties/unexpected results.

5. ***Conclusions***

- This section provides a synthesis of your work. It is not a mere summary of what has been presented before. Building on the main findings of your work, it aims to present major scientific and practical implications.
- In this section you should not introduce any new facts or ideas that are not related to what you have been presenting before.
- Each conclusion should correspond to one objective formulated earlier.
- You can also propose here what future work is needed to clarify various points that your investigation could not answer (e.g. encountered difficulties)

6. ***References***

- This section provides the list of other research works and sources that you have used to conduct your investigation and elaborate your scientific paper.
- **Any fact, idea, table, figure or other item that you have taken from other sources should be clearly highlighted as such in your text by providing the reference directly behind the fact or idea** (example see below). The reader should be able to clearly see which part of your text is based on your own thoughts, and which ideas have been taken from other sources.
- In a scientific paper, scientific journals and books (both print and online) should be the most important sources of information. References should not only comprise internet sources (e.g. Wikipedia, blogs, websites of NGOs etc.) and "grey" (i.e., unpublished) literature.
- All references should be collated at the end of your report using the **Harvard Referencing System** (see below).
- All literature sources used in your paper should appear in this section – and all references listed in this section should be used in your text.

Harvard Referencing System

How to cite in the text:

Direct quotation:

"The application of manures as surface mulch reduces water loss and might be one reason for the high water use efficiency of the oasis systems in Oman (Wichern et al. 2004:170)."

Paraphrasing:

Darwin (1859) suggested that evolution occurs by means of natural selection.

or

Evolution occurs by means of natural selection (Darwin 1859).

References:

Books:

Name of the author(s) or institution (Year): Title and subtitle. Location, i.e. City and country: Publishing Company.

Example:

Morse, Stephen (2010): Sustainability. A Biological Perspective. Cambridge et al.: Cambridge University Press.

Articles:

Name of the author(s) or institution (Year): Title. Name of journal, Volume, Issue number, pages.

Example:

Randers, Jørgen (2012). The Real Message of The Limits to Growth. A Plea for Forward-Looking Global Policy. GAIA - Ecological Perspectives for Science and Society, 21(2), 102-105.

Internet:

Name of the author(s) or institution (if available: Date of publishing): Title. Complete URL*), i.e. uniform resource locator (Date of your last access).

*) Please use a hyperlink as seen in the example below

Example:

Global Footprint Network (2013): World Footprint. Do we fit on the planet? [ONLINE]. Oakland: Global Footprint Network. Last updated on: 06/17/2013. Available: http://footprintnetwork.org/en/index.php/GFN/page/world_footprint/ [Accessed 10/22/2013].

Grading & Feedback

#module#

Speaker: _____ Date: _____

Subject: _____

Evaluator: _____

%		Grade
100,0	97	1,0
96,9	93	1,3
92,9	88	1,7
87,9	83	2,0
82,9	78	2,3
77,9	73	2,7
72,9	68	3,0
67,9	62	3,3
61,9	56	3,7
55,9	50	4,0
49,9	0	5,0

Overall result	**Maximum**	**Sum**
Grade[1]:	**100**	

Presentation feedback

1. Structuring		**Maximum**	**Result**
1.a	Objectives & contents mentioned?	(4)	
1.b	Introduction: Does it lead to the problem/subject?	(4)	
1.c	Is the presentation logically structured?	(4)	
1.d	Conclusion & summary?	(4)	
2. Slides & additional media / resources			
2.a	Readable & understandable?	(4)	
3. Presentation			
3.a	Understandable?	(4)	
3.b	Does referee understand own data or presented contents?	(6)	
3.c	Literature: Critical integration? Quality of scientific sources? Correctly quoted?	(6)	
3.d	All details necessary without overload?	(4)	
3.e	Relationship with audience?	(2)	
3.f	On time?	(4)	
3.g	Does referee respond to audience's questions?	(4)	
		Σ = 50	Σ =

Paper feedback

Criteria		**Maximum**	**Result**
1	Objectives/goals precisely formulated?	(4)	
2	Does introduction lead to the problem/subject?	(4)	
3	Text logically structured?	(4)	
4	Conclusions, summarising statements?	(4)	
5	Critical evaluation of literature?	(12)	
6	All details necessary without overload?	(6)	
7	Length of text according to requirements?	(6)	
8	Literature: Complete bibliography? Quality of scientific sources? Correctly quoted?	(6)	
9	Layout	(4)	
		Σ = 50	Σ =