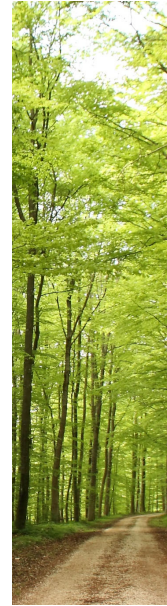


Scientific publishing

1. Why do scientists (have to) publish?
2. Which types of publications are possible?
3. How to prepare the publication?
4. What is the general structure of scientific papers?
5. Which are the characteristics of the structural components?



Introduction to scientific publishing

Content based on presentation by B. Burkhard

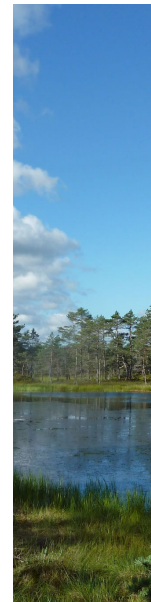
Why do scientists (have to) publish?

Purposes of publishing:

- Participating in scientific communication
- Creating and demonstrating new knowledge
- Providing new material for scientific discussion
- Participate in academic progress
- Documentation of scientific processes and their results

Motivations for publishing (authors' perspective):

- Papers as indicators for success in scientific evaluation
- Papers as background information for funding in research institutions
- Papers as criteria for project support in funding agencies
- Cumulative PhD theses need 3-4 papers in peer-reviewed journals
- Papers as media for cooperation



Introduction to scientific publishing

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Why do scientists (have to) publish?

Readers' requirements on papers:

- Authoritative high quality articles
- Ease of access
- Rapid delivery
- Convenient format
- Linking of information
- Low or no cost
- Up-to-date information
- Comprehensible, easy to read
- Short and compact information



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Why do scientists (have to) publish?

→ Diverging priorities between readers and writers

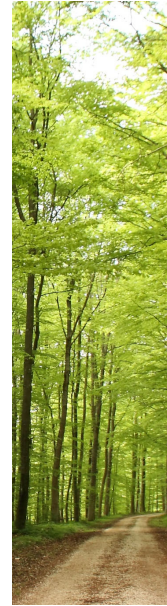
- **Author behaviour**
 - Wants to publish more
 - Peer review essential
 - Other journal functions crucial
 - Wider dissemination
 - High level of distribution
- **Reader behaviour**
 - Wants integrated systems
 - Browsing is crucial
 - Quality information important
 - Wants to read less

Introduction to scientific publishing

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Introduction to scientific publishing

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Types of publications

- Conference abstracts
- Extended abstracts
- Reports
- Theses (e.g. PhD thesis)
- Proceedings
- Books (monographs, textbooks)
- Magazines
- Journals (peer-reviewed, non-reviewed)



Introduction to scientific publishing

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Types of journals

- National vs. international
- Peer-reviewed vs. non-reviewed
- Disciplinary vs. interdisciplinary
- Commercial vs. society journal
- Commercial vs. open access journals
- Research vs. review journals
- Printed journals vs. online journals



Introduction to scientific publishing

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Indicators of journal performance

- Citation index
 - Tracking citations between journals
- Journal impact factor
 - Indicates the utility of a paper / a journal

Impact factor = papers cited / papers published

IF = 1 = 100 / 100

IF = 2 = 200/100

- Shows the prominence of a journal

- Nature	~ 30
- Science	~ 25
- Ecosystem Services	~ 4.3
- Landscape Ecology	~ 3,7
- Ecological Indicators	~ 3.2
- Progress in Physical Geography	~ 2,7

Introduction to scientific publishing

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Indicators of journal performance

Problems:

- Impact factor does not tell anything about the quality
- Only certain journals are investigated (observation procedure)
- Book publications do not count (although important)
- Impact factors differ enormously in different disciplines
- Accounting period: only two years
- Is used by universities as indicators of research efficiency
- May be a factor for employment decisions

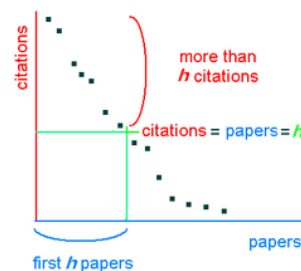
→ Journals with high impact factors have high competition, limited space and high rejection rates

Introduction to scientific publishing

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Indicators of authors' performance

- Bibliometrics
- Number of citations
- Citation index
- H-index



- Index H, defined as the number of papers with a citation number higher or equal to h, as a useful index to characterize the scientific output of a researcher

Introduction to scientific publishing

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Extending bibliometrics

History and Tasks of Bibliometrics

Wolfgang Glänzel

Structure

Introduction

Perspective shift

International panorama

The situation

Extending bibliometrics

New databases

Subject delineation

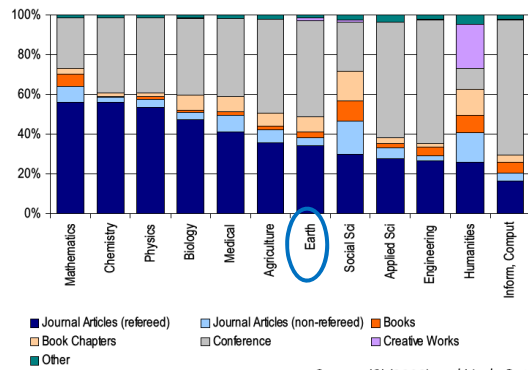
Bibliometrics and funding

Meso/micro-level bibliometrics

Ranking

Conclusions

Academic output by field of research and publication type



Source: ISI (2000) and Linda Butler (2003)

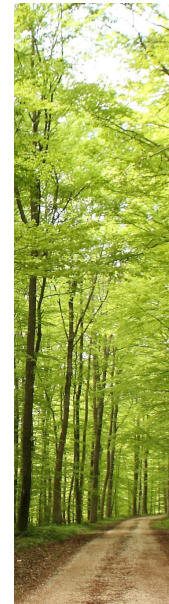
<http://www3.iam.metu.edu.tr/iam/images/2/21/Wolfgangbibliometrics.pdf>

Introduction to scientific publishing

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Scientific publishing

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Introduction to scientific publishing

Content based on presentation by B. Burkhard

Structure of papers

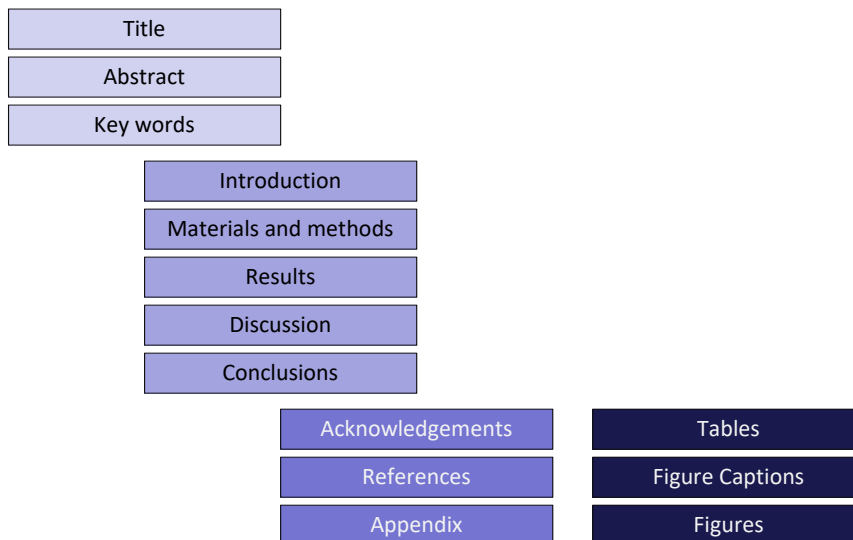
Scientific writing follows a rigid structure – a format developed over hundreds of years

Consequently, a paper can be read at several levels:

- Some people just will refer to the title
- Others may read only the title and abstract
- Others will read the paper for a deeper understanding

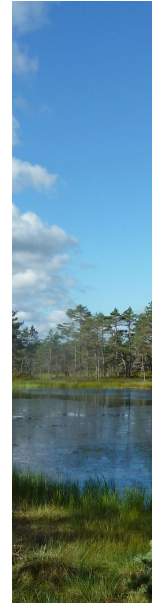


Structure of research papers



Structure of papers

- **INDEX section**
 - Titel, abstract, key words
- **IMRAD sections**
 - Introduction, materials and methods, results, discussion (+ conclusions)
- **ILRAD sections** (review articles)
 - Introduction, literature review, discussion, conclusions
- **REF section**
 - Acknowledgements, references, abstract



Introduction to scientific publishing

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Components of a paper

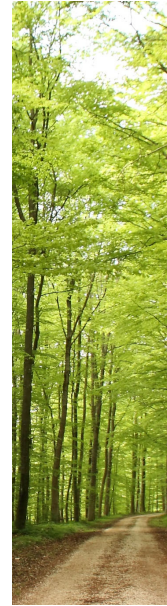
Section	Purpose
Title	Clearly describes contents
Authors	Ensures recognition for the writer(s)
Abstract	Describes what was done
Key Words (some journals)	Ensures the article is correctly identified in abstracting and indexing services
Introduction	Explains the problem
Materials and Methods	Explains how the data were collected
Results	Describes what was discovered
Discussion / Conclusions	Discusses the implications of the findings
Acknowledgements	Ensures those who helped in the research are recognised
References	Ensures previously published work is recognised
Appendices (some journals)	Provides supplemental data for the expert reader

Introduction to scientific publishing

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Introduction to scientific publishing

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Title

- Describes the paper's content clearly and precisely
- Is the advertisement for the article
- Should not use abbreviations and jargon
- Search engines/indexing databases depend on the accuracy of the title - since they use the keywords to identify relevant articles

Introduction to scientific publishing

Content based on presentation by B. Burkhard

Title

- **Title should be.....**
 - Short
 - Informative
 - Explaining the subject of the study
 - May contain paper type (e.g. review)
 - Should be understandable in isolation
 - Should be specific (not too general)
 - Should not include abbreviations

Authors listing

- ONLY includes those who have made an intellectual contribution to the research
- OR those who will publicly defend the data and conclusions, and who have approved the final version
- Order of names of authors can vary from discipline to discipline
 - Usually, the corresponding author's name appears first

Abstract

- **Briefly** summarizes (often 150 words) - the problem, the method, the results, and the conclusions so that
 - the reader can decide whether or not to read the whole article
- Together, the title and the abstract should stand on their own
- Many authors write the abstract last so that it accurately reflects the content of the paper
- Abstract serves to choose respective reviewers
- A miniature version of the whole text; 200-500 words in one paragraph

Keywords

- Search machines work with key words
- Key words help finding relevant articles quickly
- Usually not more than 5-7 key words
- No words which are already written in the title
- No key words which nobody would search for

Introductoin

- Clearly states the:
 - Problem being investigated
 - Background that explains the problem
 - Reasons for conducting the research
- Summarizes relevant (available) research to provide the context of the paper
- States how your work differs from published work
- Identifies the questions to be answered
- Explains what other findings, if any, the study is challenging or extending

Introduction to scientific publishing

Content based on presentation by B. Burkhard

Introductoin

- **Introduction should include** information about:
 - The background
 - The motivation
 - The state-of-the-art
 - The respective gaps in knowledge
 - Definitions (if necessary)
 - Objectives and questions
 - Structure of the paper

Knowledge in the
broader field



Study focus

Introduction to scientific publishing

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Definition of the objectives

- (Clear) objectives will guide the reader
- Without objectives the reader is lost
- Objectives are the guidelines of the paper's structure
- Objectives are carrying the message of the paper
- Research questions, better narrow than broad



Introduction to scientific publishing

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Materials and methods

- Provides the readers enough details, so they can understand and replicate the research
- Explains how the problem was studied, identifies the procedures followed, and orders these chronologically where possible
- Explains new methodology in detail; otherwise method are named and cited from previously published work
- Includes the frequency of observations, what types of data were recorded, etc.
- Should be precise in describing measurements and include errors of measurement or research design limits

Introduction to scientific publishing

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Results

- Objectively presents the findings and explains the results
- Shows that new results are contributing to the body of scientific knowledge
- Follows a logical sequence based on the tables and figures presenting the findings to answer the question or hypothesis
- Figures should have a brief description (a legend), providing the reader sufficient information to know how the data were produced

Results

- Should refer to the objectives
- Only the important and relevant results should be selected
- Headings and subheadings to structure the section
- Optimizes information presented in tables and figures
- Should not be wordy, but as objective and concise as possible

Discussion

- Principles, relationships and generalizations that can be interpreted by the results
- Reports about unexpected results or problems occurring due to the state-of-the-art
- Critical assessment of the study design and methods, limitations in analysis or validity
- Relationship with other results from the literature
- Theoretical implications of the results

Discussion/conclusion

- Describes what results mean in context of what was already known about the subject
- Indicates how the results relate to expectations and to the literature previously cited
- Explains how the research has moved the body of scientific knowledge forward
- Conclusions should not be extended beyond what is directly supported by the results - undue speculation should be avoided
- Outlines potential next steps for further study!

Conclusions

- Which conclusions can be drawn from the paper?
- No summary, no new facts
- Shortly describes the main message the focal general outcome of the work
 - what can be learned from the paper?
- Refers to objectives and questions/hypotheses in the introduction
- Describes next steps

Acknowledgements

- Optional section
- Should be kept short
- Acknowledges significant support (technical and financial support, data, information, reviewers,..)
- If persons are acknowledged, it should be written what for
- Often: standard text necessary to acknowledge funding agencies

References

- Good reference lists support credibility, validity, communication
- In press: Accepted papers
- Papers “in prep” or “in review”: should usually not be used
- All references should have been read by the author(s)
- Only references which are used in the paper
- Grey literature should be avoided (no quality control)

References

- Whenever drawn upon previously published work, the source must be acknowledged
- Any information not from the experiment and not ‘common knowledge’ should be recognized by a citation
- How references are presented varies considerably – should refer to notes/guidelines for authors for the specific journal
- References that are difficult to find should be avoided
- Listing related references that were not important to the study should be avoided

Harvard Reference Style

Uses the author's name and date of publication in the body of the text (**Adams 1983a**), and the bibliography is given alphabetically by author

Adams, A.B. (1983a) Article title: subtitle. Journal Title 46 (Suppl. 2), 617-619

Adams, A.B. (1983b) Book Title. Publisher, New York.

Bennett, W.P., Hoskins, M.A., Brady, F.P. et al. (1993) Article title. Journal Title 334 , 31-35.

Vancouver Reference Style

Uses a **number series** to indicate references; bibliographies list these in numerical order as they appear in the text

1. Adams, A.B. (1983) Article title: subtitle. Journal Title 46 (Suppl. 2), 617-619.

2. Lessells, D.E. (1989) Chapter title. In: Arnold, J.R. & Davies, G.H.B. (eds.) Book Title , 3rd edn. Blackwell Scientific Publications, Oxford, pp. 32-68.

3. Bennett, W.P., Hoskins, M.A., Brady, F.P. et al. (1993) Article title. Journal Title 334 , 31-35.

Appendix

- Additional information
 - Data
 - Tables
 - Model codes
 - questionnaires
- Optional
- Often only available on-line

