Writing a Scientific Paper

Department of Computer and Information Science
Faculty of Science and Technology

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Overview

- Task of writing a research paper can be daunting

- Even with ground-breaking research, unless the paper is correctly written:
  - at best, publication will be delayed
  - at worse, never published

Author's Perspective

Motivations to publish:
- – Dissemination
- – Career prospects
- – Research funding
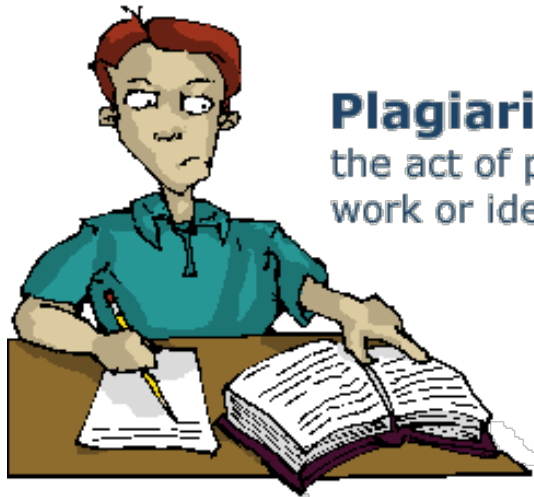- – Patent protection
- – Other

Key Elements of Publishing

- Ethical Issues

- Style and language

- Structure of paper

- Components of paper

- Article submission/journal selection

- Publisher's process/peer review

Ethical Issues

- Fabrication of Data
- Plagiarism
- Acknowledgment of funding sources

Plagiarism: the act of presenting another's work or ideas as your own.

Cut & Paste

Paraphrase!!!

Style and Language

- Refer to the journal's author guide for notes on style
  - Some authors write their paper with a specific journal in mind
  - Others write the paper and then adapt it to fit the style of a journal they subsequently choose

- Objective is to report your findings and conclusions clearly and concisely as possible

Style and Language

- If English is not your first language, find a native English speaker (if possible) to review the content and language of the paper before submitting it

- Regardless of primary language, find a colleague/editor to review the content and language of the paper

Structure of a Paper

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

Components of a Paper

Section	Purpose
Title	Clearly describes contents
Authors	Ensures recognition for the writer(s) / designer(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
Methods	Explains how the data were collected
Results	Describes what was discovered
Discussion	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

Title

- Describes the paper's content clearly and precisely including keywords

- Is the advertisement for the article

- Do 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

Abstract

- **<u>Briefly</u>** summarize (150 to 300 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

Introduction

- Clearly state the:
  - Problem being investigated
  - Background that explains the problem
  - Reasons for conducting the research
- Summarize relevant research to provide context
- State how your work differs from published work
- Identify the questions you are answering
- Explain what other findings, if any, you are challenging or extending
- Briefly describe the experiment, hypothesis(es), research question(s); general experimental design or method

Methods

- Provide the reader enough details so they can understand and replicate your research

- Explain how you studied the problem, identify the procedures you followed, and order these chronologically where possible

- Explain new methodology in detail; otherwise name the method and cite the previously published work

- Include the frequency of observations, what types of data were recorded, etc.

- Be precise in describing measurements and include errors of measurement or research design limits

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Results

- Objectively present your findings, and explain what was found

- Show that your new results are contributing to the body of scientific knowledge

- Follow 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

Discussion/Conclusion

- Describe what your results mean in context of what was already known about the subject

- Indicate how the results relate to expectations and to the literature previously cited

- Explain how the research has moved the body of scientific knowledge forward

- Do not extend your conclusions beyond what is directly supported by your results - avoid undue speculation

- Outline the next steps for further study

References

- Whenever you draw upon previously published work, you **must** acknowledge the source
- Any information not from your experiment and not 'common knowledge' should be recognized by a citation
- How references are presented varies considerably - refer to notes for authors for the specific journal
- Avoid references that are difficult to find
- Avoid listing related references that were not important to the study

Harvard Reference Style

Uses the author's name and date of publication in the body of the text, 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.

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Article Submission

- Select your journal carefully
- Read the aims and scope
- Think about your target audience and the level of your work – do you have a realistic chance of being accepted?
- **Follow the guidelines** in the notes for authors and include everything they ask – it makes the editor's job easier…
- Articles should **not** be submitted to more than one journal at a time

Online Submission

- Most publishers now offer a completely electronic submission process

- Article is submitted online and all of the review procedure also happens online

- Speeds up the editorial process

Author Priorities for Journal Selection

- Key (Determining) factors
  - Impact Factor
  - Reputation
  - Access to the target audience
  - Overall editorial standard
  - Publication speed
  - International coverage

- Marginal (Qualifying) factors
  - Experience as a referee
  - Track record
  - Quality and colour illustrations
  - Service elements

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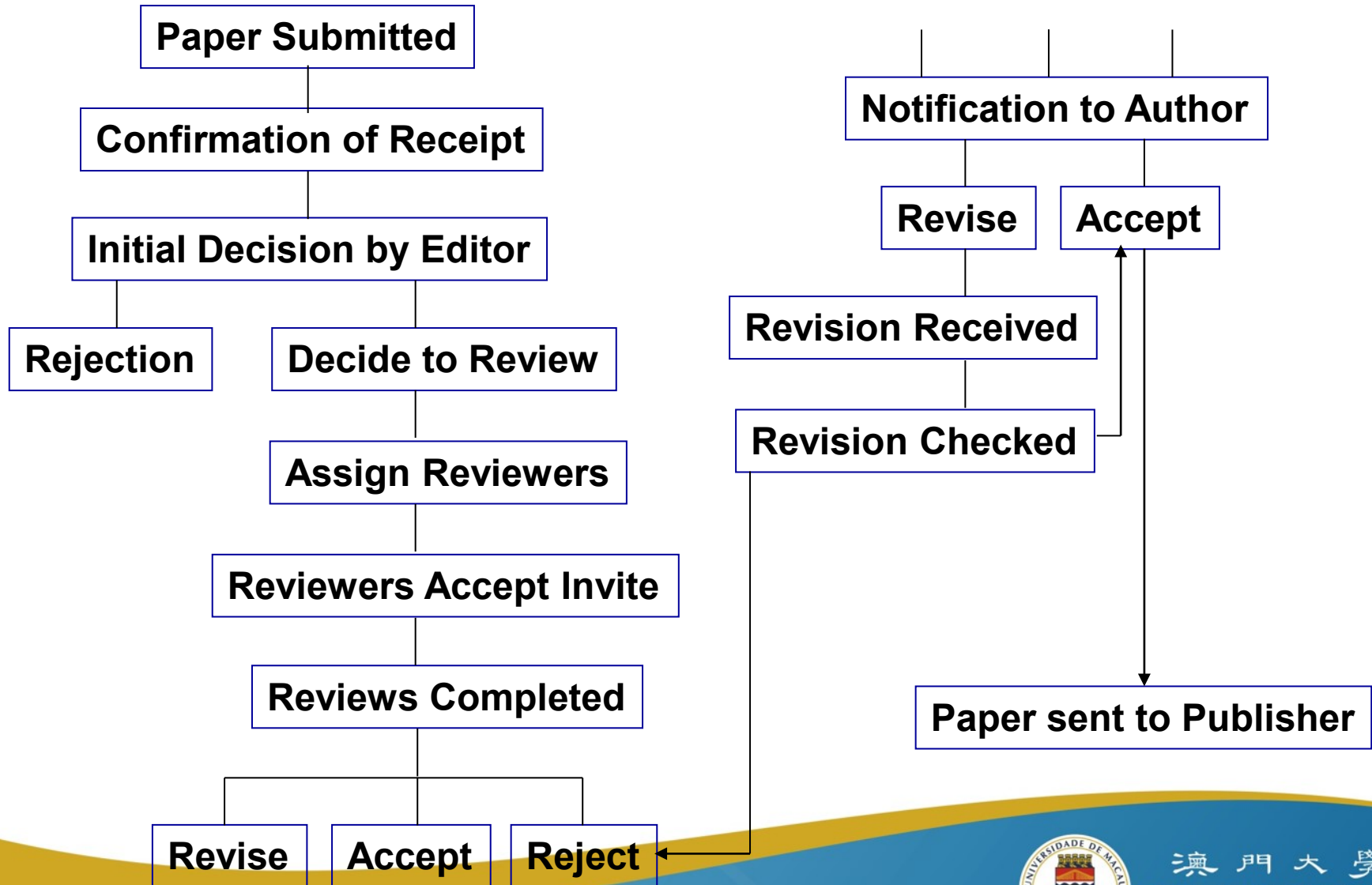UNIVERSIDADE DE MACAU
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After Submission

- Most journal editors will make an initial decision on a paper - to review or to reject

- Most editors appoint at least two referees

- Refereeing speed varies tremendously between journals

- Authors should receive a decision of Accept, Accept with Revision (Minor or Major), or Reject

- If a paper is rejected, most editors will write to you explaining their decision

- After rejection, authors have the option of submitting the paper to another journal - editor's suggestions should be addressed

Overview of Peer Review Process

Paper Submitted → Confirmation of Receipt → Initial Decision by Editor → Rejection / Decide to Review → Assign Reviewers → Reviewers Accept Invite → Reviews Completed → Revise / Accept / Reject

Notification to Author → Revise / Accept
Revise → Revision Received → Revision Checked → Accept / Reject
Accept → Paper sent to Publisher

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Publishing Tips

Editors and reviewers are looking for original and innovative research that will add to the field of study; keys are:

- For research-based papers, ensure that you have enough numbers to justify sound statistical conclusions

- For a larger study, it may be better to produce one important research paper, rather than a number of average incremental papers

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Course Paper

- Deadline: December 12, 2021

- Submission in UMMoodle

- Format: Single column, 11-point font, 1.5 line spacing, 10 to 30 pages

- Include all paper components if possible

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Q&A

Thank you for your support to this course!!