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Research Methodology in Computer Science (AI800)

Lecture 9

How to Write A Scientific Article

Prepared by
Dr. Mohammed Anbar

Outlines

- Learning Outcomes
- Research Article Writing
- Scientific Paper in Computer Science Research
- The Process of Paper Writing
- Research Paper Contents and Tips to prepare.
- Guidelines for Writing Scientific Paper
- Getting Ready To Publish?
- Are you ready to publish?
- Choosing the Right Journal for Your Article
- Tools to help you choose the right journal
- Journals' Instructions to Authors
- Peer-review & responding to reviewers
- Things to consider and Conclusion

Learning Outcomes

- To help you write research paper and develop strategies for successfully writing a paper.
- To learn about the impact factor and other metrics used to evaluate journals, as well as tips for navigating the submission and review process.
- To help you to Choose the Right Journal for Your paper and understand the importance of selecting the right journal for your research
- To gain a deeper understanding of the academic publishing process and the criteria used by journals to evaluate articles

Scientific Paper in Computer Science Research

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- A scientific paper is a *formal document* that presents *original findings*, *ideas*, or *experiments*.
- A scientific paper is a *written* and *published report describing* original research *results*.
- A scientific paper follows a *specific structure* and *format*, *including*:
  - ❑ Abstract
  - ❑ Introduction
  - ❑ Methodology
  - ❑ Results
  - ❑ Discussion
  - ❑ Conclusion.

Scientific Paper in Computer Science Research (cont.)

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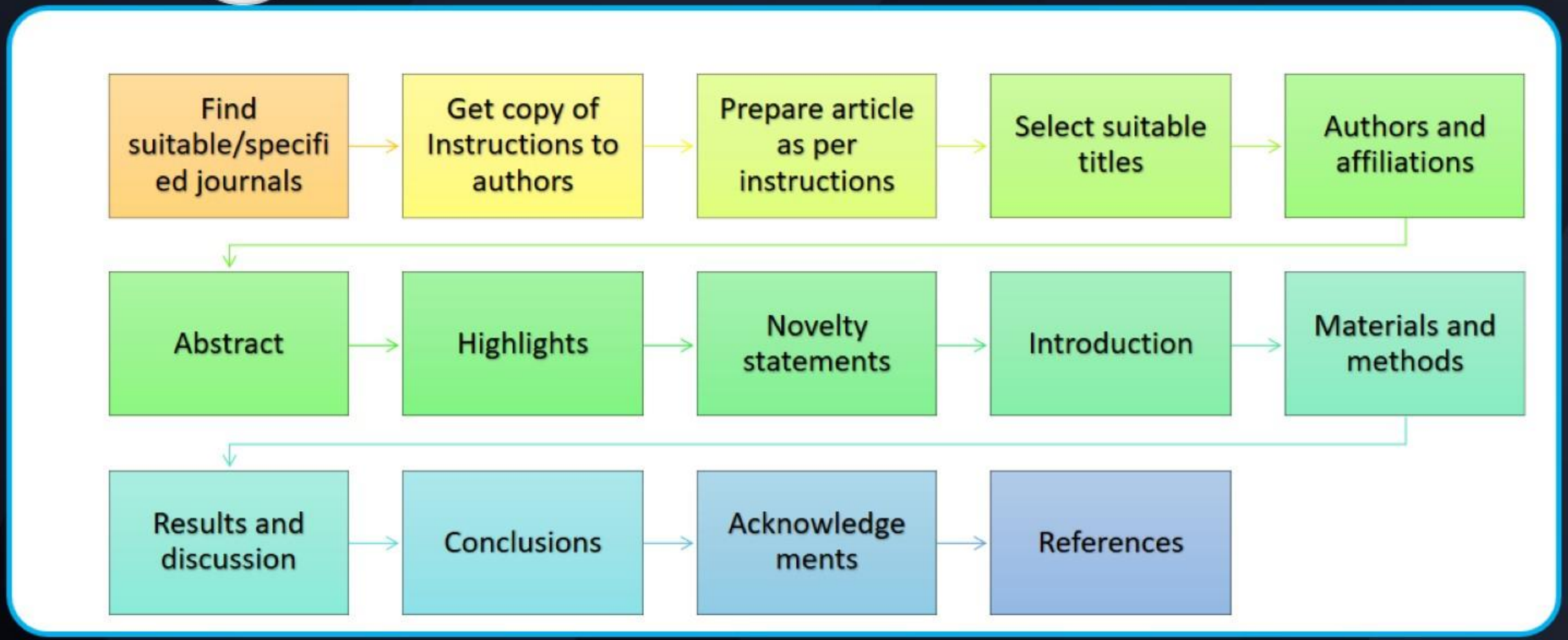
- A scientific papers are typically *published* in *peer-reviewed journals* or *presented* at *conferences* to *share knowledge* and *contribute* to the advancement of computer science.

- A scientific papers *serve* as a means for researchers to *communicate* their work to the scientific community and *provide* a foundation for further research and development.

The Process of Paper Writing

Research Paper Writing



The Scientific Paper: Title

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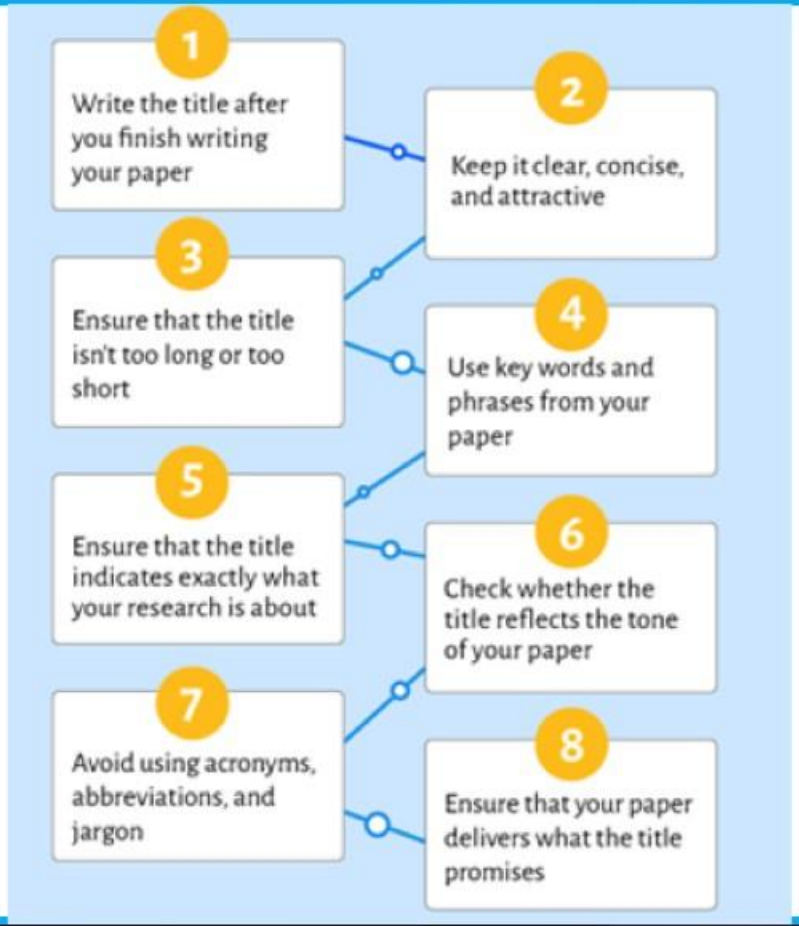
- Title of a scientific paper is a concise and informative representation of the study's main findings or objectives.
- Title should accurately reflect the content of the paper and catch the reader's attention.
- A well-crafted title can effectively communicate the essence of the research, making it easier for others to locate and understand the study.
- Additionally, a clear and compelling title can increase the visibility and impact of the paper within the scientific community.

The Scientific Paper: Title (cont.)

- Be concise and clear
- Capture the essence of your study
- Use descriptive language
- Use a catchy phrase
- Reflect the paper Essence



The Scientific Paper: Abstract

- The abstract is a concise summary of the scientific paper, providing an overview of the study's purpose, methods, results, and conclusions.
- The abstract is typically written in a clear and concise manner to allow readers to quickly understand the main points of the research.
- The abstract often includes keywords that help researchers locate relevant articles when conducting literature searches.

Criteria of the Abstract

- Abstract length shouldn't go past 250 words.
- One paragraph should be used for the abstract.
- Since the abstract refers to completed work, it should be written in the past tense.
- The abstract abbreviation, which is used throughout the abstract and paper, should come after lengthy words.
- Except in rare circumstances, references in an abstract should not be cited.
- Never include any information or conclusions in the abstract that are not included in the paper. Must be precise regarding to the numbers cited in the main text.

The Scientific Paper: Keywords

- Keywords are an essential component of a scientific paper as they provide a concise summary of the main topics and themes explored in the research.
- These words are carefully chosen to ensure that the paper is easily discoverable by other researchers and relevant to their specific areas of interest.
- Keywords help to establish the paper's relevance within the larger scientific community and facilitate its inclusion in databases and search engines.

Tips to Write Paper keywords

- Be specific: Choose keywords that accurately reflect the main theme or topic of your paper. Avoid using broad or generic terms that may not effectively capture the essence of your research.
- Consider relevance: Think about the keywords that are commonly used in your field or discipline. By including these relevant terms, you increase the chances of your paper being discovered by others in your area of study.
- Use variations: Incorporate alternative terms for your main keywords to expand the reach of your paper

The Scientific Paper: Introduction

- The introduction section of a scientific paper serves as a roadmap for the reader, providing background information on the topic and outlining the purpose and objectives of the study.
- The introduction sets the stage for the research by highlighting the gap in knowledge that the study aims to address.
- The introduction may also include a brief review of relevant literature to establish context and justify the significance of the research.

Tips to Write Paper Introduction

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- Draw audience in; be provocative
- Target journal specific audience
- Identify gaps in knowledge
- End with question/hypothesis

1. Introduce your topic
2. Describe your background
3. Establish your research problem
4. Specify your objectives
5. Map out your paper

The Scientific Paper: Methods/Materials

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- The methods/materials section of a scientific paper provides a detailed description of the experimental procedures and the materials used in the study.
- The methods/materials section allows other researchers to replicate the study and verify its findings. It typically includes information on the sample size, data collection methods, equipment used, and any statistical analyses performed.
- The methods/materials may also mention any ethical considerations or approvals obtained for conducting the research.

Tips to Write Paper Methods/Materials

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- Clearly outline the purpose and objectives of your study at the beginning of your methods section.
- Describe your research design in detail, including any experimental or observational procedures used.
- Provide a comprehensive list of all materials, equipment, and instruments used in your study.

The Scientific Paper: Results

- Results section presents the findings of the study and provides a detailed analysis of the data collected.
- Results includes statistical analyses, graphs, and tables to support the conclusions drawn from the research.
- The results section also highlights any significant patterns or trends observed in the data, allowing readers to evaluate the validity and reliability of the study's outcomes.
- Results section may discuss any unexpected results and offer possible explanations or suggestions for further investigation.

Tips to Write Paper Result

- Organize around tables/figures
- Past tense
- No interpretation; just the facts!
- Tables should stand on their own
- Present Data:
  - Directly in the text
  - In a table
  - In a figure

The Scientific Paper: Discussion

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- In the discussion section of a scientific paper, researchers :
  - Interpret and analyze their findings in relation to the existing literature.
  - Discuss the implications of their results, identify limitations, and propose future directions for research.
  - Address any unexpected results

- The discussion section allows scientists to critically evaluate their own work and contribute to the broader scientific community's understanding of the topic.

Tips to Write Paper Discussion

- Start by summarizing the main findings and results of your research
- Analyze and interpret your results in relation to the existing literature.
- Discuss how your findings align with or differ from previous studies.
- Explain any potential implications or limitations.
- Consider addressing any unexpected or contradictory results

The Scientific Paper: Conclusion

- Conclusion section not only summarizes the key results and implications of the study but also provides avenues for future research and further exploration in the field.
- Conclusion section allows scientists to reflect on the limitations of their study and suggest potential improvements or alternative methodologies for future investigations.

Tips to Write Paper Conclusion

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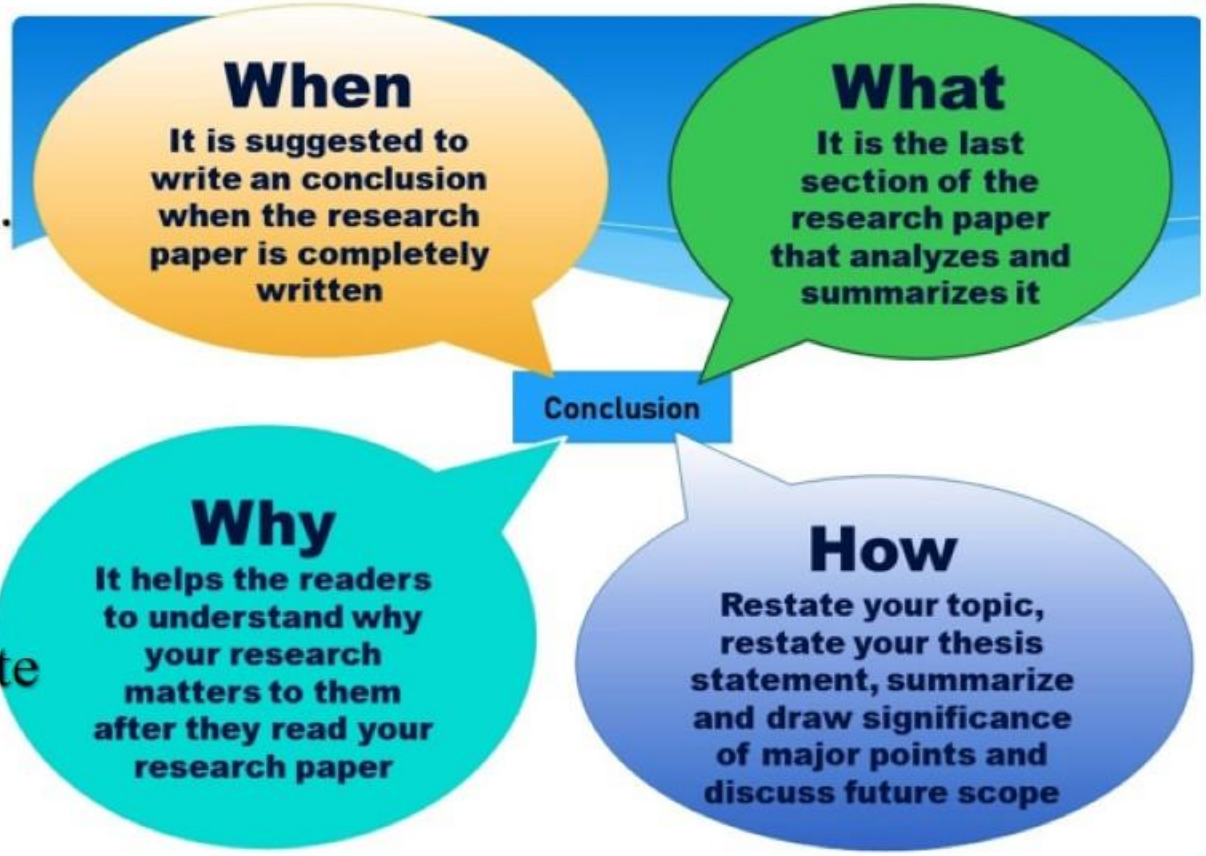
- Summarize the main points.
- Provide a final thought or reflection.
- briefly recap the key arguments or findings you have presented throughout your paper.
- Explain how your findings contribute to the existing body of knowledge



The Scientific Paper: Acknowledgment

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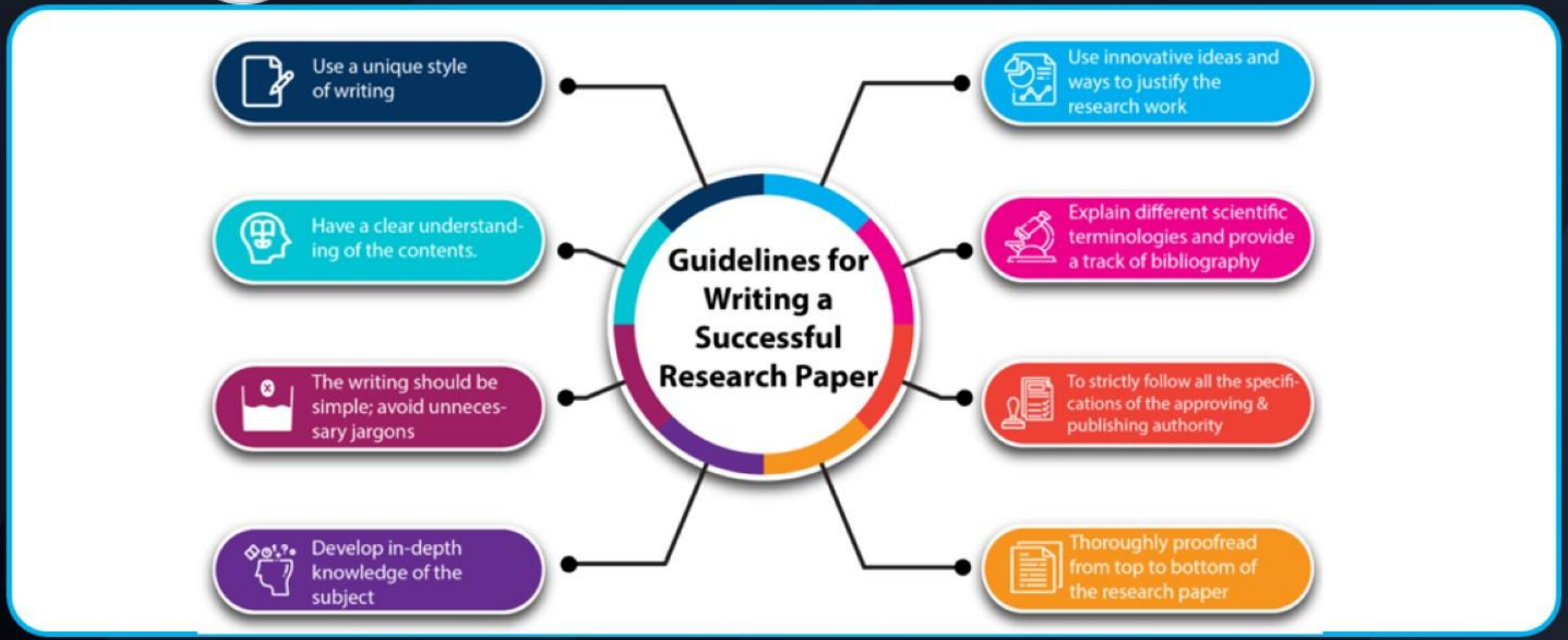
- The acknowledgment section of a scientific paper is a way for the authors to express gratitude and recognize individuals or organizations that have contributed to the research.
- Acknowledgment is an important part of the paper as it allows researchers to show appreciation for those who have provided support, guidance, or resources throughout the study.
- Acknowledging others also helps to establish credibility and foster collaboration within the scientific community.

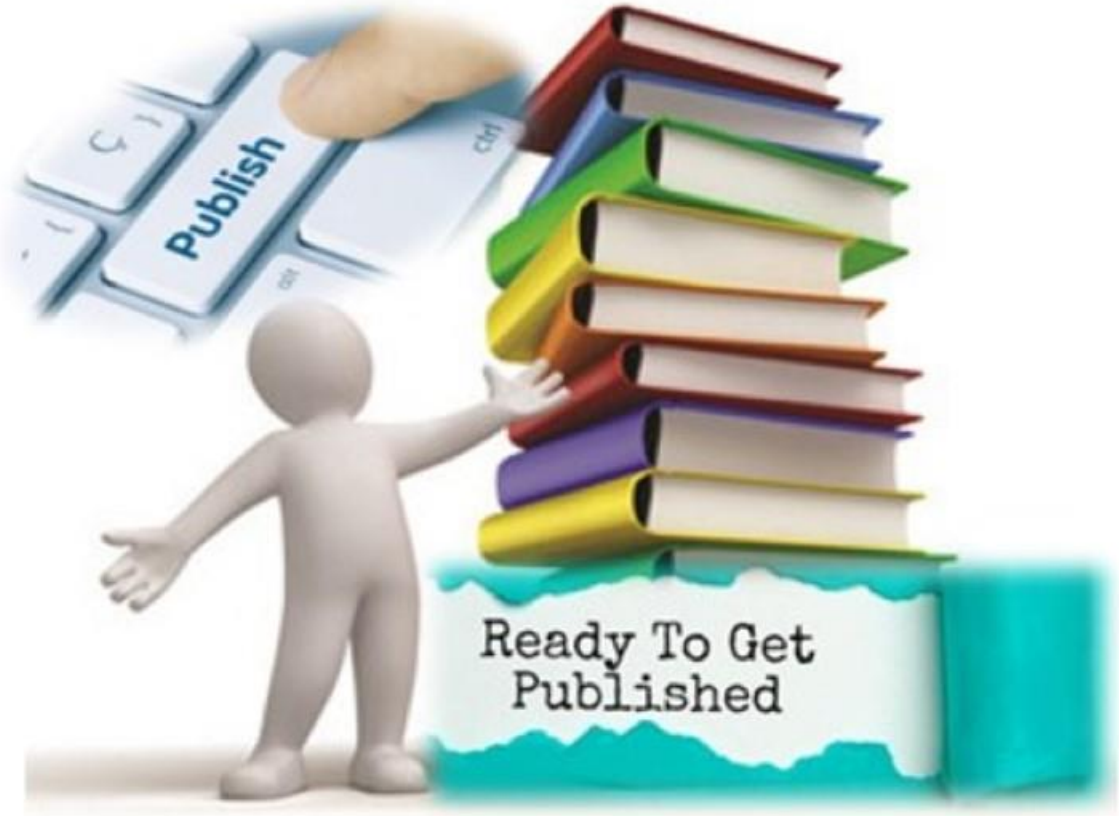
The Scientific Paper: References

- The references section of a scientific paper is an essential component that provides credibility and support to the research findings.
- The references section includes a list of all the sources cited within the paper, such as academic journals, books, and reputable websites.
- These references not only acknowledge the work of other researchers but also allow readers to delve deeper into the topic and verify the accuracy of the information presented.
- Additionally, proper citation and formatting in this section are crucial to adhere to academic standards and avoid plagiarism.

Guidelines for Writing Scientific Paper



Getting Ready To Publish?



- Do Not Rush
- Choose the Right Publication, Magazine, or journal for Your paper.
- All the necessary citation requirements are met.
- Journal Terms and Conditions Apply

Are you ready to publish?

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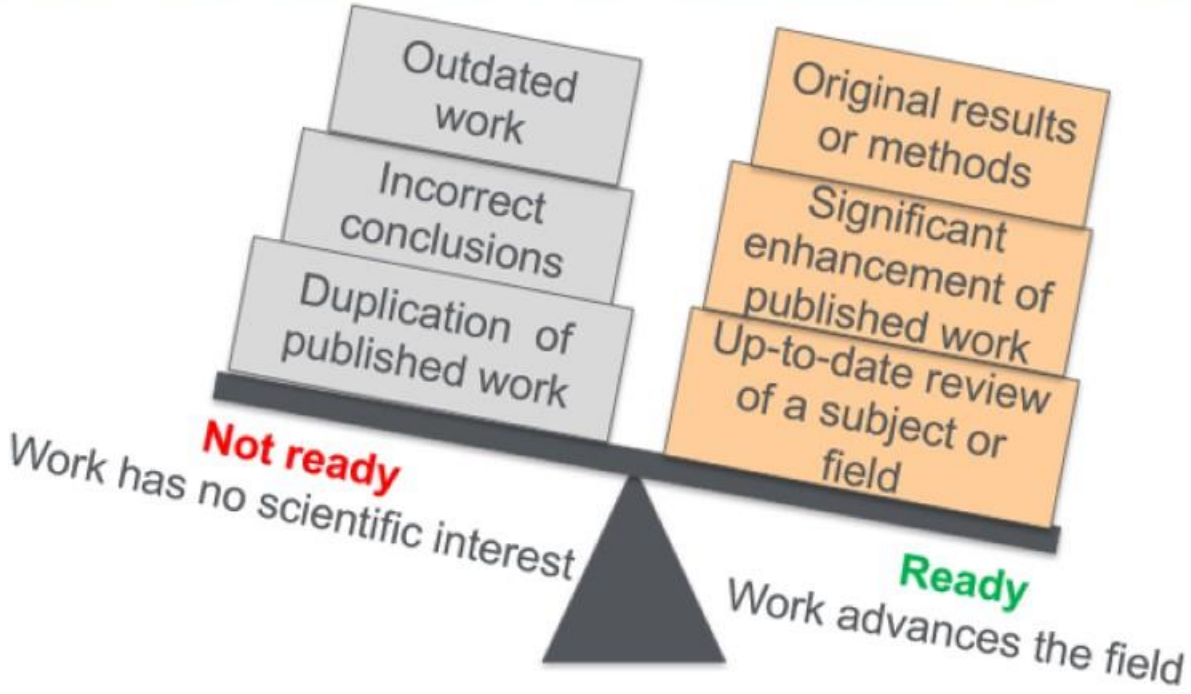
Your manuscript conveys a straightforward, actionable, and exciting message in a well-organized structure that readers will appreciate.



Choosing the Right Journal for Your Article

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- Be sure to share your work with the intended audience.
- Since concurrent submissions are prohibited, pick just one journal.
- Supervisors and coworkers can offer helpful suggestions.
- Choose a few potential journals for your shortlist.
- Look into the journals on your shortlist:
  - ❑ Aims & Scope
  - ❑ Types of articles considered
  - ❑ Readership e.g. academic versus practice
  - ❑ Subscription versus Open Access
  - ❑ Speed of publication
  - ❑ Peer review process (single blind, double blind, open)
  - ❑ Content innovation

Tools to help you choose the right journal

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ELSEVIER

Elsevier journal finder

Clarivate

EndNote™

EndNote Match: Find the Best Fit Journals for Your Manuscript

Springer Journal Suggester

Find the right journal

Springer journal Suggester

THINK CHECK SUBMIT

Think. Check. Submit

Web of Science Group

CoS Center for Open Science

Web of Science Master List

Publish & Flourish

Publish or Flourish Open Access

Jane Journal/Author Name Estimator

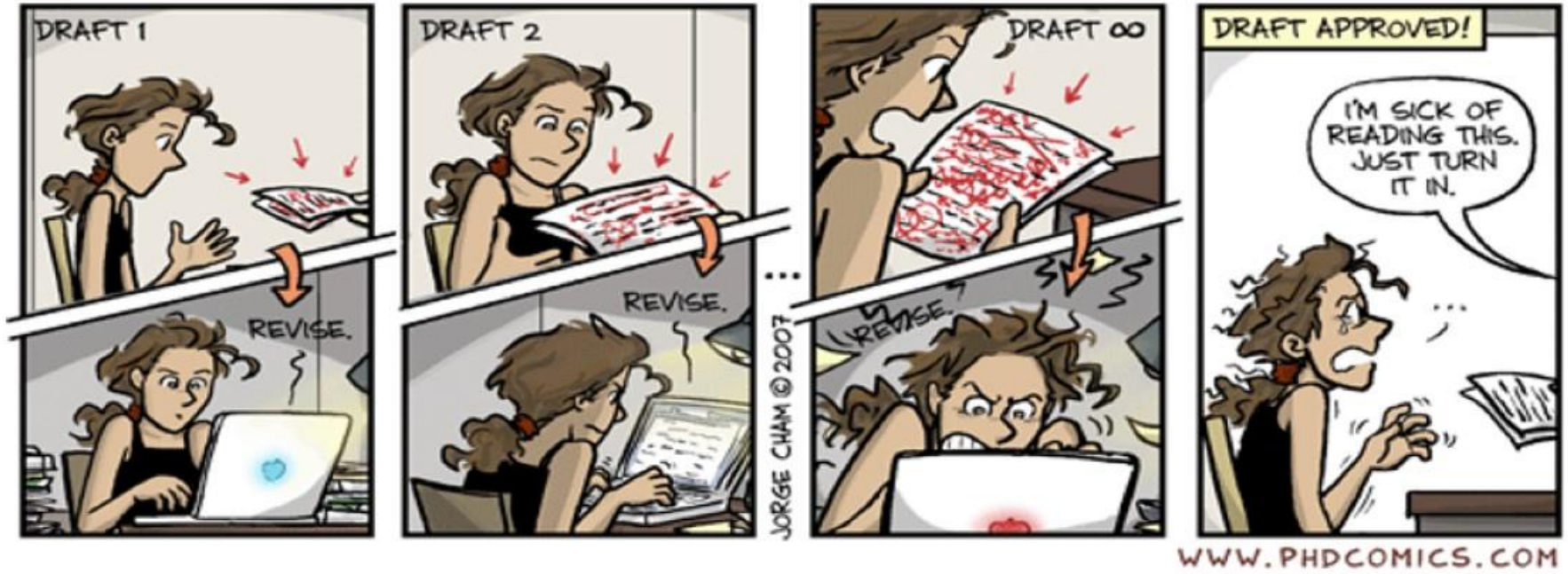
Journal/Author Name Estimator (JANE)

Tools to help you choose the right journal (cont.)

Journals' Instructions to Authors

- Read the instructions to authors before starting to prepare your paper.
- Consult the instructions while preparing your paper.
- Check the instructions again before submitting your paper.

Revise before submission



Proofread before Submitting

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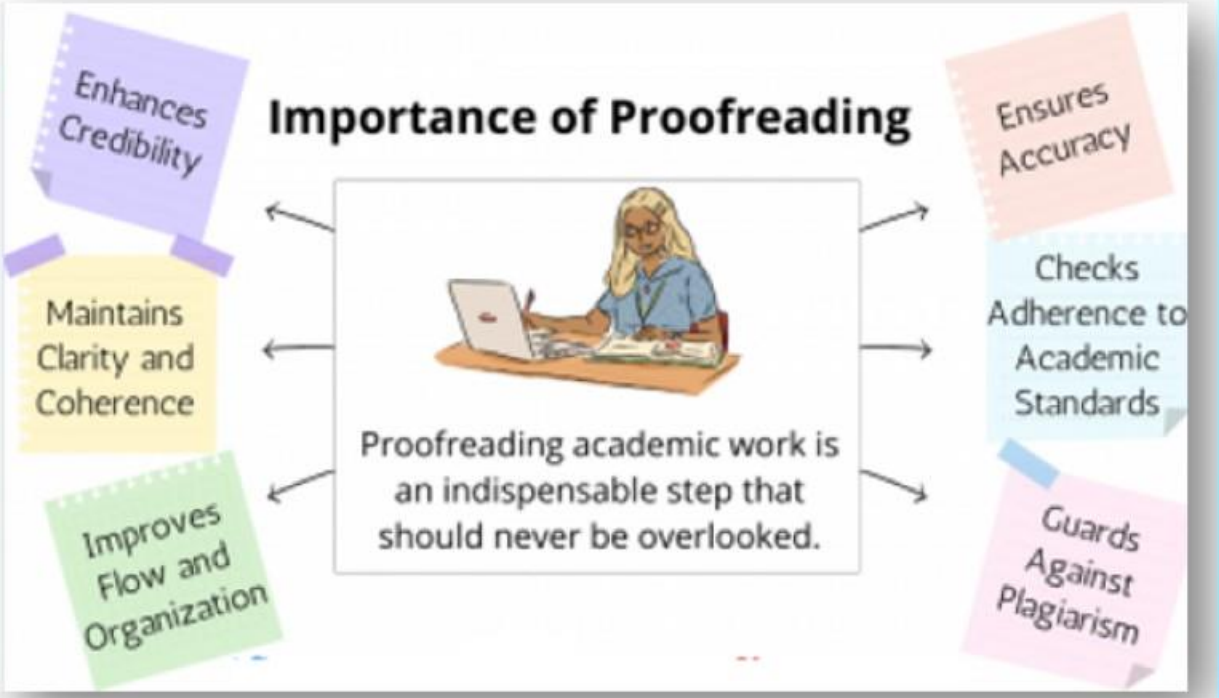
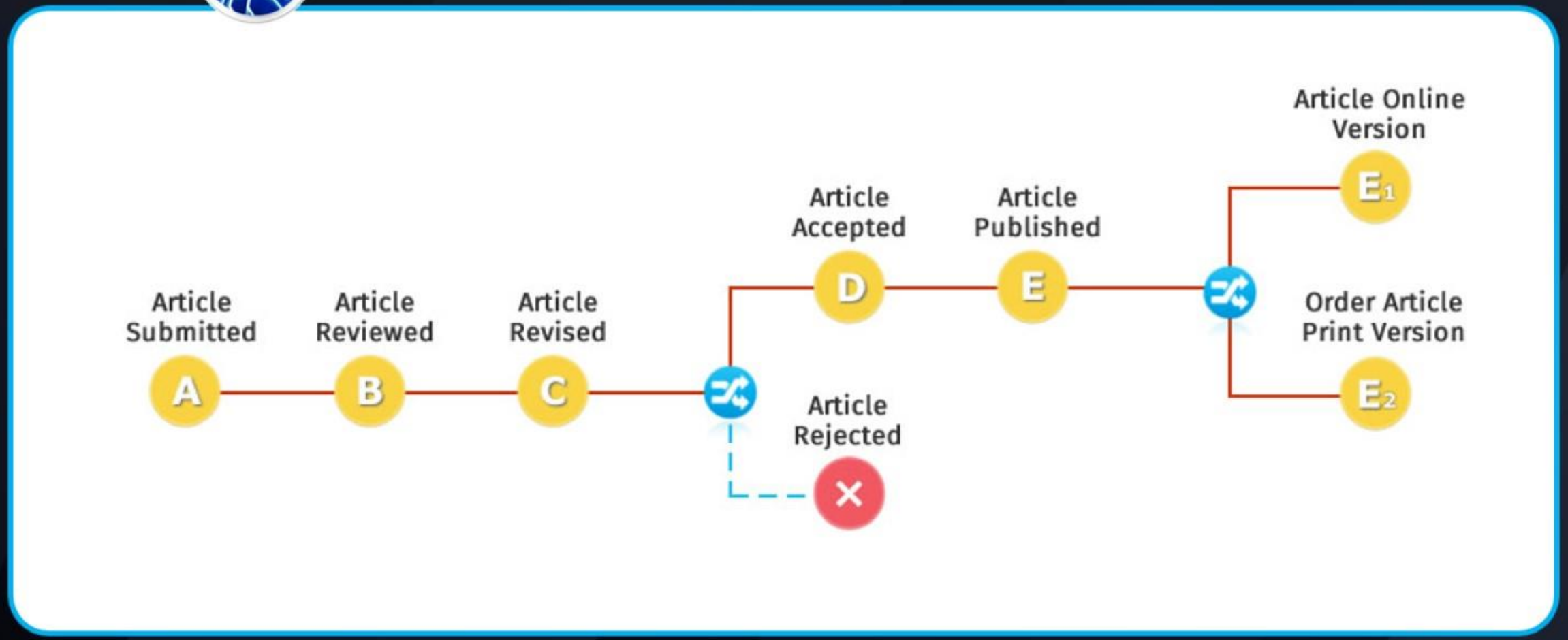
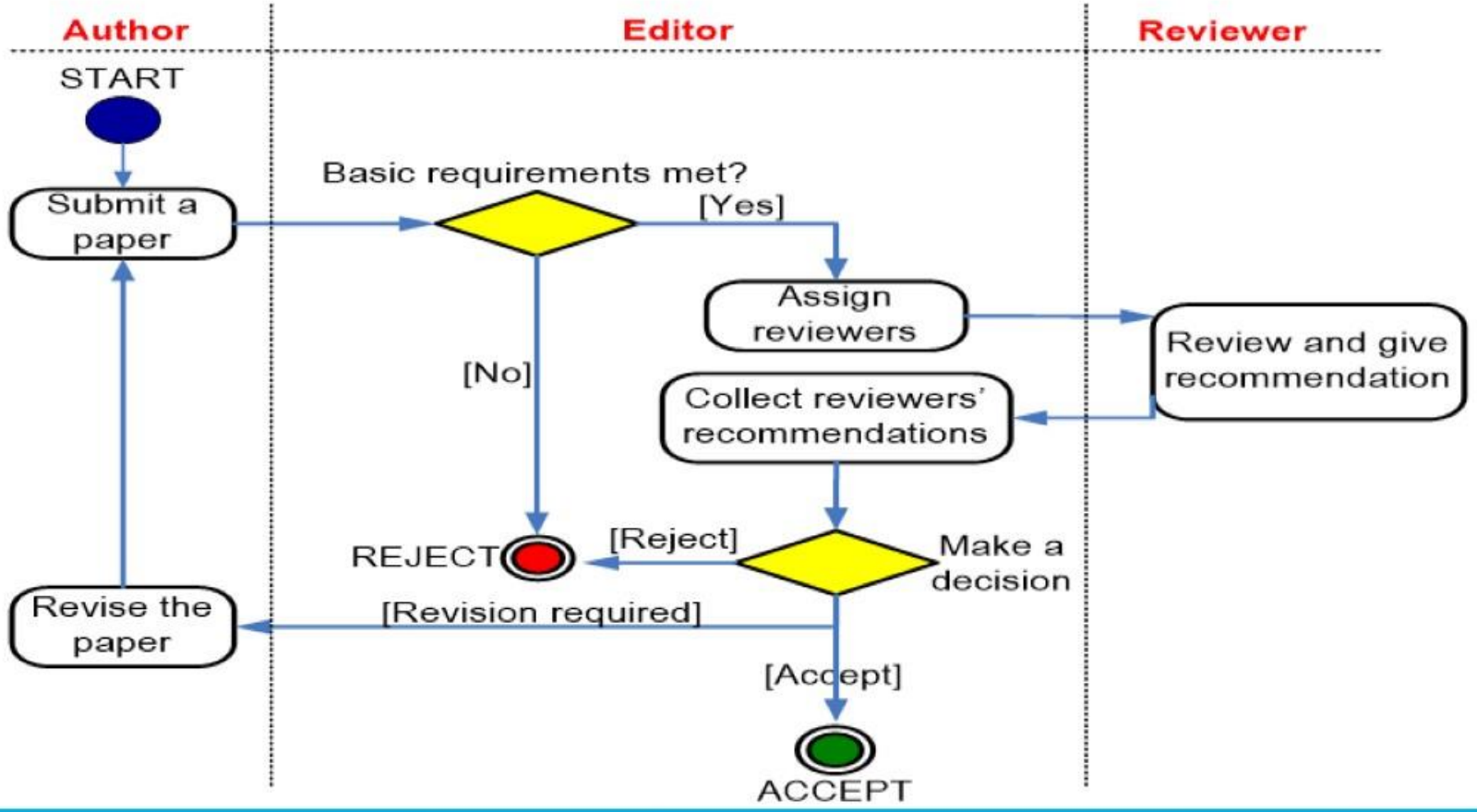
- Are terms used consistently throughout?
- Do numbers in abstract match numbers in text and tables?
- Do citations in text match references?
- Are Syntax and Grammar acceptable ?



Peer-review & responding to reviewers



Peer-review & responding to reviewers (cont.)



Things to consider

- It is possible for a journal to have a medium to high impact factor but a low h-index and g-index.
- However, despite a high h- and g-index, a journal may not be ranked at all in JCR.
- Using the h- and g-index to rank journals is not standardized practice.
- Social sciences rank lower than sciences.

Things to consider (cont.)

1. Impact Factor is a metric that measures the average number of citations that articles published in a specific journal receive over a certain period, typically the past two years.

2. Impact Factor is often used to assess the relative importance and influence of a journal in a particular field. Journals with higher impact factors are generally considered more prestigious.

Here's a simplified example:

In 2023, you determine that "Science Journal X" received a total of 800 citations for articles published in 2021 and 2022.
During the same two-year period (2021 and 2022), "Science Journal X" published a total of 100 articles. Now, you can calculate the Impact Factor:

Impact Factor (IF) = Total citations in 2023 to articles published in 2021 and 2022 / Total number of articles published in 2021 and 2022
IF = 800 citations / 100 articles
IF = 8.0

Things to consider (cont.)

- The h-index, or Hirsch index, is a metric used to evaluate the research output and impact of a researcher or a journal. It is designed to measure both the productivity and impact of an individual or a journal's publications.
- An h-index of 'h' means that a researcher (or journal) has 'h' papers that have each been cited at least 'h' times. For example, an h-index of 10 means that a researcher (or journal) has 10 papers cited at least 10 times each.

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Thank You