HOW TO WRITE A GOOD RESEARCH PAPER

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INTRODUCTION

- A research paper is a *written document that presents the findings of a study or investigation conducted by a researcher* or *a group of researchers*.
- It is a formal and structured piece of academic or scientific writing that communicates the research process, results, and conclusions to the scholarly community and the public.
- They facilitate the improvement of existing theories and the generation of new ideas.

Why research papers are crucial

- **Purpose**:
  - Research papers are key to advancing knowledge in various fields.
  - They are critical for academic and professional growth.
- **Impact**:
  - Understanding the world better and driving progress in disciplines like medicine, science, economics, etc.
- **First scientific journals**:
  - "***Journal des sçavans***" (France) and "philosophical transactions of the royal society of London" (1660s)

Why researchers publish – the SULTAN pyramid

- **S** – Study requirements (e.g., MD, MS, PhD degrees)
- **U** – Career prospects and updation (e.g., Promotions, salary hikes)
- **L** – Long-term sustainability (e.g., Academic tenure)
- **T** – Teaching and leadership prospectives (e.g., Becoming a departmental head or dean)
- **A** – Advancement of policies (e.g., Health or economic policies)
- **N** – Name and recognition (e.g., Gaining fame in society or among peers)

- Writing a research paper is an iterative process.
- Which can be broken into THREE steps:
    - 1. RESEARCH AND PLANNING
    - 2. WRITING
    - 3. REVISION

RESEARCH AND PLANNING

- **Select a research topic:**
  - Brainstorm Your Interests:
    - Begin by exploring topics that interest you, ensuring they are relevant to your field.
    - What issues or questions do you find engaging?
  - Narrow or Broad:
    - **Broad topics**: Easier to start but harder to focus.
    - **Narrow topics**: More focused but require specific knowledge and deeper investigation.

Advice is to start broad, then narrow your focus as you progress

  - Conduct a **literature review** to find gaps or unresolved issues in current research.
  - **Consult with mentors** or professors for advice on narrowing your topic and feasibility in terms of resources and time.

- **Relevance of your research topic**
  - Will your research address a relevant problem in your field?
  - Is it significant for society or a particular community?

  Always aim for relevance in your research—choose topics that contribute to larger conversations in your field.

- **Assessing feasibility**
  - Do you have the necessary resources (data, equipment)?
  - Is your timeframe sufficient for the complexity of the topic?
  - Can the research be conducted ethically and within institutional guidelines?

  Always balance ambition with practical constraints.

- **Ethical considerations in research**
  - Ensure your research complies with ethical standards.
  - Avoid topics that could harm individuals or communities.
  - Obtain necessary approvals from institutional review boards (IRB).

- **Using the FINER criteria for a strong research question**
- **FINER**:
  - **F** – Feasible: adequate subjects, resources, and time.
  - **I** – Interesting: engages both the researcher and the community.
  - **N** – Novel: extends or refutes previous hypotheses.
  - **E** – Ethical: complies with institutional ethical standards.
  - **R** – Relevant: important to scientific knowledge and future research.

- **Ensure the research question follows the PICOT format**:
  - **P** – Population: what population are you studying?
  - **I** – Intervention: what is the investigational intervention?
  - **C** – Comparison: what is the alternative you are comparing it to?
  - **O** – Outcome: what results do you intend to measure?
  - **T** – Time: what is the appropriate follow-up time to assess outcomes?

- **Plan for sample size:**
  - **Importance**: proper sample size ensures that your research can detect significant effects.
  - **Steps**:
    - Determine population size (if known).
    - Choose a confidence interval and level (typically 95%).
    - Use statistical tools to estimate necessary sample size.
    - Estimate your sample size carefully to ensure your study has enough statistical power to detect significant results.

WRITING

Title	Abstract	Introduction	Methods
Results	Discussion	Conclusion	References

- **Title:**

The title is the face of your research paper. It’s the first thing readers and reviewers see.

- Keep it concise (avoid more than 15 words), informative, precise and descriptive.
- Include key terms related to your study.
- It should reflect the aim, method, and scope of your study.
- Avoid jargon, abbreviations, and overly long phrases.
- It should not be very lengthy.
- It should not be misleading.

Abstract:

It’s the “trailer” of your paper, giving readers a quick preview.

- Summarize your paper’s purpose, methods, findings, and implications in **250 words** or less. Write this after completing the main sections.
- **Structured abstract** (IMRaD format):
  - **Introduction**: what problem are you addressing?
  - **Methods**: how did you conduct your research?
  - **Results**: what were your main findings?
  - **Discussion**: why are your findings important?
- **Do’s**: Be clear and chronological; include significant results and follow word count limits.
- **Don’ts**: avoid quotations, tables, or detailed results in the abstract; don't copy-paste from the paper’s body.

Introduction:

- The introduction should lay a strong foundation for the paper
- Introduce your research question and set the context by summarizing existing knowledge. Identify the **knowledge gap** your research aims to fill.
- **Key elements**:
  - **Background**: provide context and summarize the current knowledge.
  - **Knowledge gap**: identify what's missing in current research.
  - **Research question**: state your hypothesis or objectives.
  - **Significance**: explain why this research matters.
- **Do's**: keep the introduction **focused** on framing the problem; in simple sentences and in the present tense.
- **Don't**: write a **literature review** in the introduction

- # Methods:
  - The methods section allows readers to replicate your study.
  - Provide a **detailed explanation** of how your study was conducted.
  - You must mention ‘what’, ‘how much’, ‘how often’, ‘where’, ‘when’ and why’ clearly to provide a step-by-step tutorial for your reader
  - Include all relevant details like materials, techniques, and statistical analyses so others can replicate your work.
  - **Key elements**:
    - What was done (e.g., Experiments, data collection)?
    - How it was done (e.g., Equipment, settings, procedures)?
    - Why certain approaches were chosen (e.g., Research design rationale)?
    - Use flowcharts or diagrams (e. g., **CONSORT flow diagram**) to improve clarity.
    - Include inclusion/exclusion criteria and ethical approvals.
- **Do’s**: Write in **past** tense; Provide enough **detail** so others can replicate your study; Organize the steps **chronologically**.
- **Don’ts**: Don’t mix **results** with methods; avoid adding **background information**—save it for the discussion.

Results:

The results section conveys the findings of the study.

- Present your data **visually** with graphs, tables, and figures.
- Keep it concise and use the past tense.
- Include **statistical analyses** to back up your findings.
- Focus on **significant findings** first.

- **Do’s**: Use **tables** and **figures** appropriately (number tables and figures according to their appearance).
- **Don’ts**: Don’t **restate raw data** excessively and avoid adding **interpretations** here—save it for the discussion.

The ten steps for presenting the results

1. **Organize the draft** to maximize clarity, using simple past tense to the reader
2. Start with an opening sentence like “our result shows” and restate the research questions.
3. **Include patient data**: screened, enrolled, included, and excluded (with reasons).
4. **Highlight principal findings**, focusing on key observations.
5. **Number tables/figures** and provide descriptive captions; minimize the need for extra explanation.
6. **Revise constantly** for language, scientific accuracy, and correct data.
7. **Follow journal guidelines** for formatting.
8. Include all the positive as well as the negative results which are statistically significant.
9. **Ensure consistency** with other sections.
10. Any data which has not been mentioned in the results section cannot be discussed later. If there are too many results then try and categorize them further into subheadings.

Discussion:

- The discussion explains the significance of the findings.
  - **Interpret your results**: explain how they support or refute your hypothesis.
  - **Contains 3 main paragraphs**:
    1. Restate your main **findings**.
    2. Compare results with **previous studies** and explain. why the study is new, why it is true, and why it is important for future clinical practice.
    3. The final paragraph should include a ‘take-home message’ (about one or two) and point to future directions for investigation that have resulted from this study.
- **Do’s**: connect the findings to the **research question**.
- **Don’ts**: avoid **repeating results** without discussing them and don’t introduce **new data** in the discussion.

- **Conclusion:**
  - Summarize key findings, and implications and suggest future work.
  - Answer the “So what?” Question—why should the reader care about your research?
  - Keep the conclusion concise—avoid adding new information.
  - Keep it brief, avoid new information, and focus on takeaways for future studies.
  - **Don'ts**: Avoid undermining your authority or expressing doubt (**No apologies**).

References:

- Role of references:

1. Demonstrate the foundation of the study – to establish the research question.
2. Support the novelty and value of the study.
3. Link one study to others creating a web of knowledge that carries meaning.
4. Allows researchers to identify work as relevant in general and relevant to them.
5. Create values that are internal to science (e.g., Relevance, credit).
6. Create values that are external to science (e.g., Provide avenues to determine accountability and researchers or funding performance).

- Summarize key findings, and implications and suggest future work.
- Properly credit the work of others and avoid plagiarism.
- Use **citation management tools** for accuracy (like Endnote or Zotero).
- Use the format required by your journal (APA, MLA, Chicago, or Vancouver).

REVISION AND PROOF READING

Revision: refining your paper for clarity and impact

- Ensure that the language is clear and the argument flows smoothly.
- Look for ambiguous sentences or jargon and simplify them where possible.
- That headings, font sizes, and citation styles are consistent.
- Verify that all tables, charts, and figures are correctly labelled
- Cross-check numbers and statistics for accuracy.
- Ensure each section flows logically, and transitions between ideas are smooth.
- Ensure all references are properly cited within the text and in the bibliography.
- Double-check the citation format required by the journal.
- Use plagiarism-checking tools to ensure originality. Avoid copy-pasting text from sources—paraphrase and cite properly.

- **Additional elements:**
  - **Keywords:** Include relevant **keywords** for indexing. This helps others find your research more easily.
  - **Acknowledgements:** Give credit to those who helped you, including funding bodies, collaborators, and mentors.
  - Ensure the paper adheres to submission guidelines and is ready for submission.

BIBLIOMETRICS: MEASURING RESEARCH IMPACT

- **Impact factor**:
  - Calculated annually by Clarivate Analytics
  - Measures journal influence based on citations in the last 2 years.
  - Higher value = more influential journal.
- **Cite score**:
  - Includes citations from all article types (editorials, conference papers, etc.).
  - Broader assessment of journal impact over 3 years.
- **H-index**:
  - Author-level metric; combines quantity (papers) and quality (citations).
  - Measures both productivity and impact.
- **Orcid**:
  - Unique researcher identifier.
  - Tracks publications and social media mentions.

CONCLUSION

S. No.	Section		
	Original Paper	**Case Reports**	**Dissertation**
1.	Abstract	Abstract	Introduction
2.	Introduction	Introduction	Review of literature
3.	Methods	Case summary	Methods
4.	Results	Discussion	Results
5.	Discussion	Conclusion	Discussion
6.	Conclusion	Acknowledgement	Conclusion
7.	Acknowledgement	References	Acknowledgement
8.	References	----	References

A well-written research paper not only advances knowledge but also contributes to your personal and professional growth.

Approach the process with care, and success will follow.