

Phase 3: Completion and Impact (Delivering and Beyond) Communicating Engineering Research: Writing and Presenting Effectively

[Watch Webinar Recording Here](#)

3 September 2026

Presenter: Emeritus Professor Akhtar Kalam
EIT EMERITUS PROFESSOR



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We are dedicated to ensuring that you receive a world-class education and gain skills that you can immediately implement in the workforce.



World-Class Australia Accredited Education

Our vocational programs and higher education degrees are registered and accredited by the Australian Government. We have programs that are also recognized under three international engineering accords.



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We deliver our programs via a unique delivery methodology that makes use of live and interactive webinars, an international pool of expert lecturers, dedicated learning support officers, and state-of-the-art such as hands-on workshops, remote laboratories, and simulation software.

Introduction – Presenter

Emeritus Professor Akhtar Kalam

Emeritus Professor at Victoria University and EIT.

Academic Director and Chair of the Academic Board - Texila College Australia.

Director of Al-Kalam Educational Solutions.

Editor-in-Chief of AJEEE

Distinguished Professor/Adjunct Faculty in Australia, India, Malaysia and Oman.

He has published over 610 publications in his area of expertise and has written over 29 books.

Supervised 56 postgraduate research students to graduation, including 38 PhD's, 5 DEng and 13 MEng. Currently, 7 postgraduate research students (4 PhD students at VU and 3 DEng students at EIT) are being supervised.

Public, University, and Motivational Lecturer.

Consultant for the electricity supply industries in Australia and overseas.

Assisted in change management plans for Universities and the higher education sector.

Education

The University of Bath, Bath, UK, D.Eng., Electrical Engineering

The University of Oklahoma, Norman, USA, MS, Electrical Engineering

Aligarh Muslim University, Aligarh, India, BSc. Eng., Electrical Engineering

St Xavier's College, Calcutta, India, Applied Science

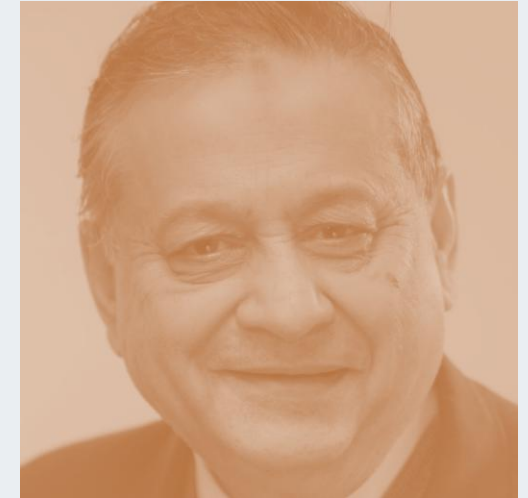
Professional Society Activities

Australian Institute of Energy – Fellow

Engineers Australia – Fellow

The Institution of Engineers and Technology, UK – Fellow.

The Institution of Electrical and Electronic Engineers, USA –Life Senior Member.



“My vision is to provide exciting higher education science and engineering courses, research, consultancy and collaborate in development work of the industry and communities within Australia and beyond.”

Agenda

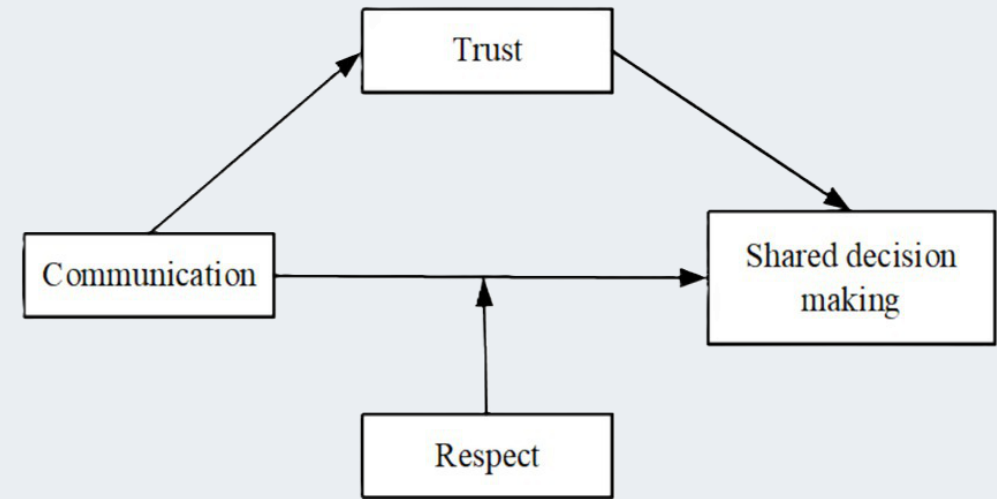
1	Introduction: Why communication matters?
2	Research thinking and argument
3	Proposal and literature review
4	Technical academic writing
5	Figures, tables and visualisation
6	Journal papers
7	Thesis writing
8	GenAI and research communication
9	Presenting research
10	Audience, Q&A and defence



Why Communication Matters in a DEng?

Research communication determines whether others can:

- Understand your research problem
- Appreciate its significance
- Evaluate your methodology
- Trust your results
- Reproduce your work
- Use your findings
- Cite and build upon your research



The Doctoral Researcher as a Communicator

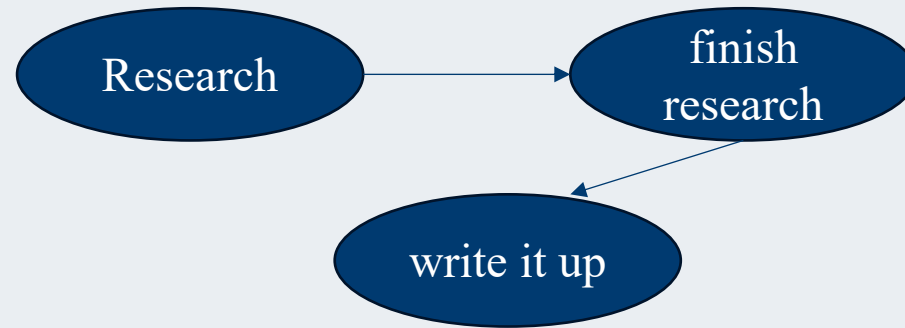
A DEng researcher communicates to multiple audiences:

Audience	What they need?
Supervisor	Evidence of progress and reasoning
Examiner	Originality, rigour and contribution
Journal reviewer	Validity and scholarly significance
Conference audience	Key findings and implications
Industry	Practical value
Government	Policy relevance
General public	Meaning and significance

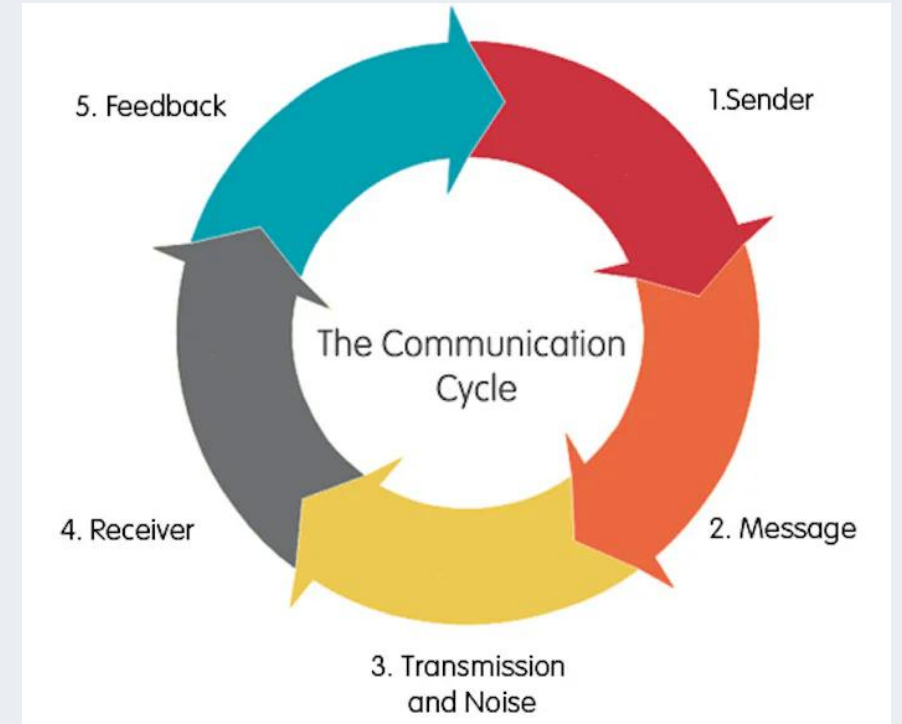
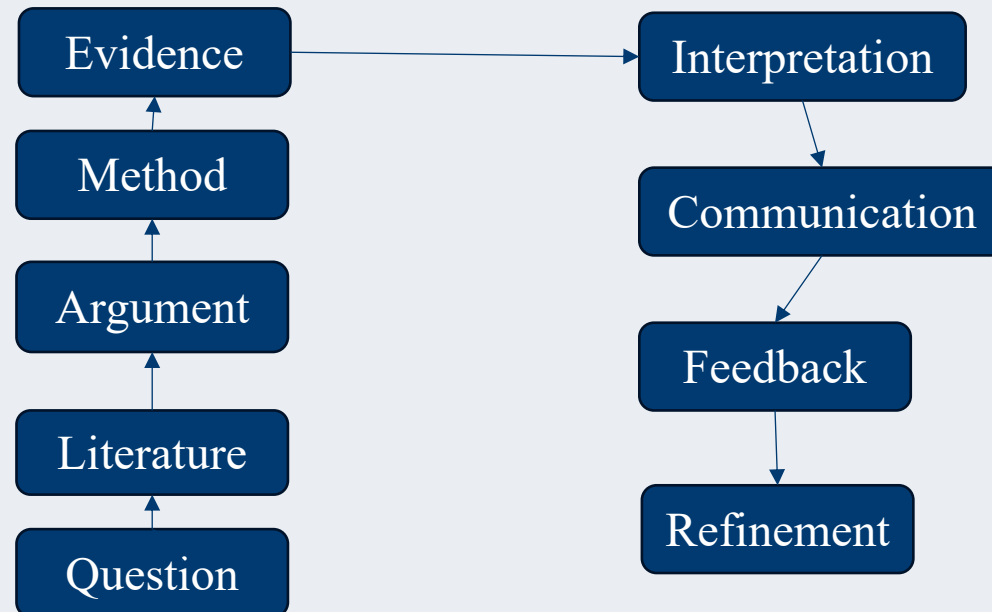


Communication Is Part of the Research Process

Do not think:

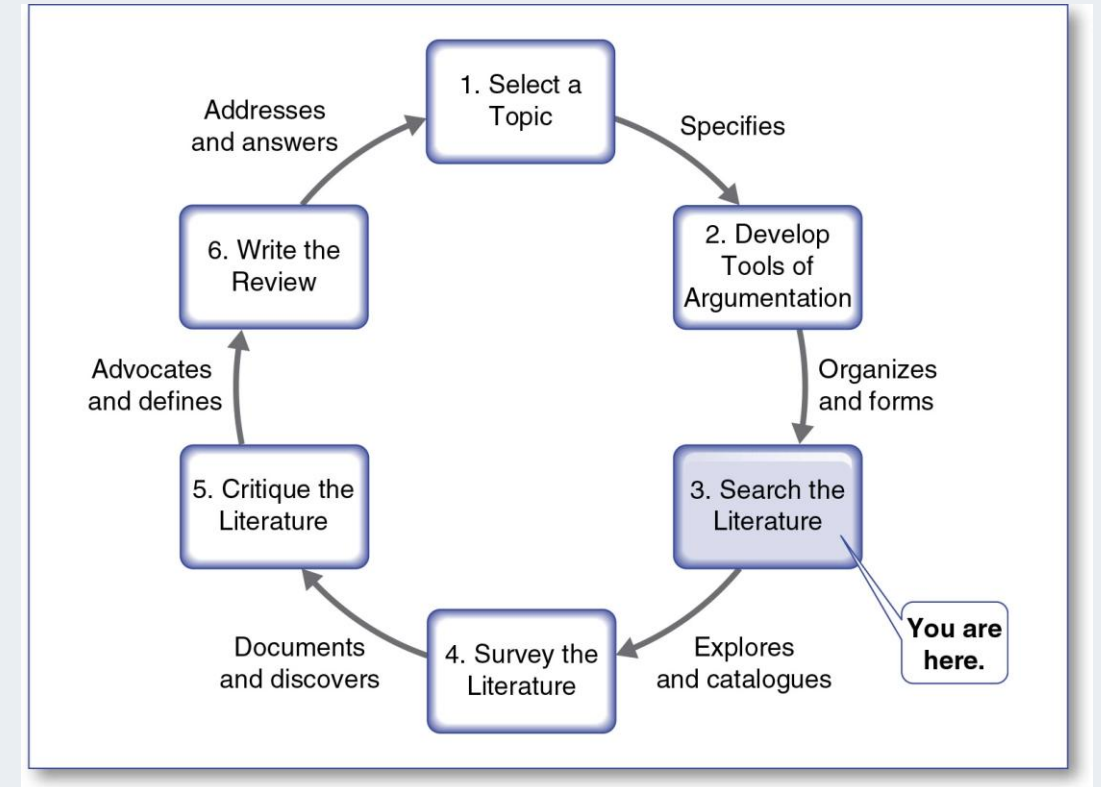
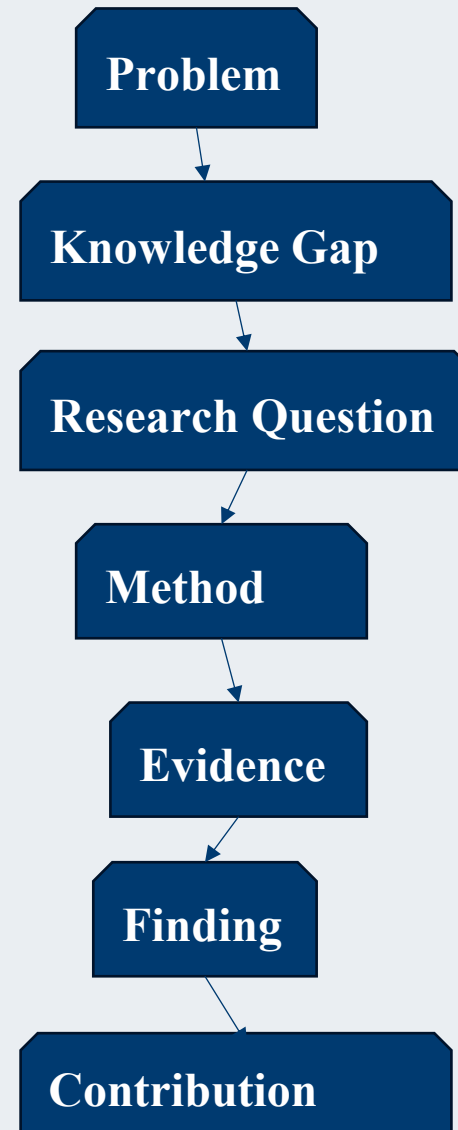


Think:



The Research Story

Every successful research project tells a story:



PART I — THINKING BEFORE WRITING

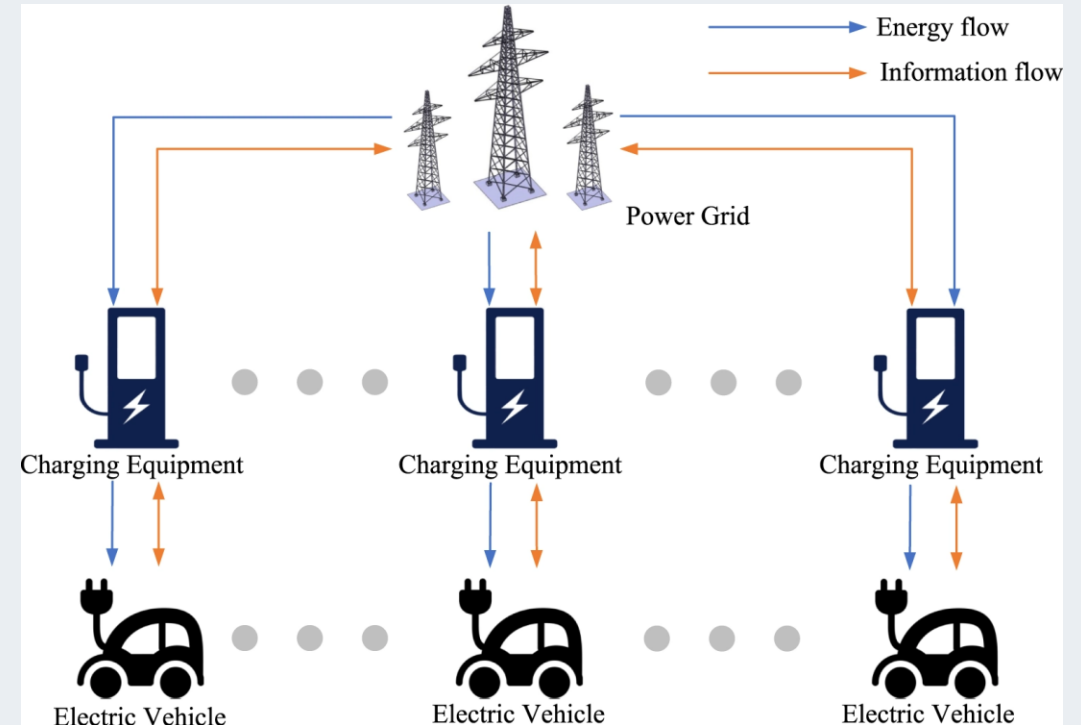
Start With the Research Problem

A strong research problem should answer:

- What is happening?
- Why is it important?
- Who is affected?
- What is currently inadequate?
- Why does the problem remain unresolved?

Example:

Existing EV load forecasting approaches perform poorly under rapidly changing charging behaviour and high renewable penetration.



Topic $\neq$ Problem $\neq$ Gap

Topic

Artificial intelligence for power systems

Problem

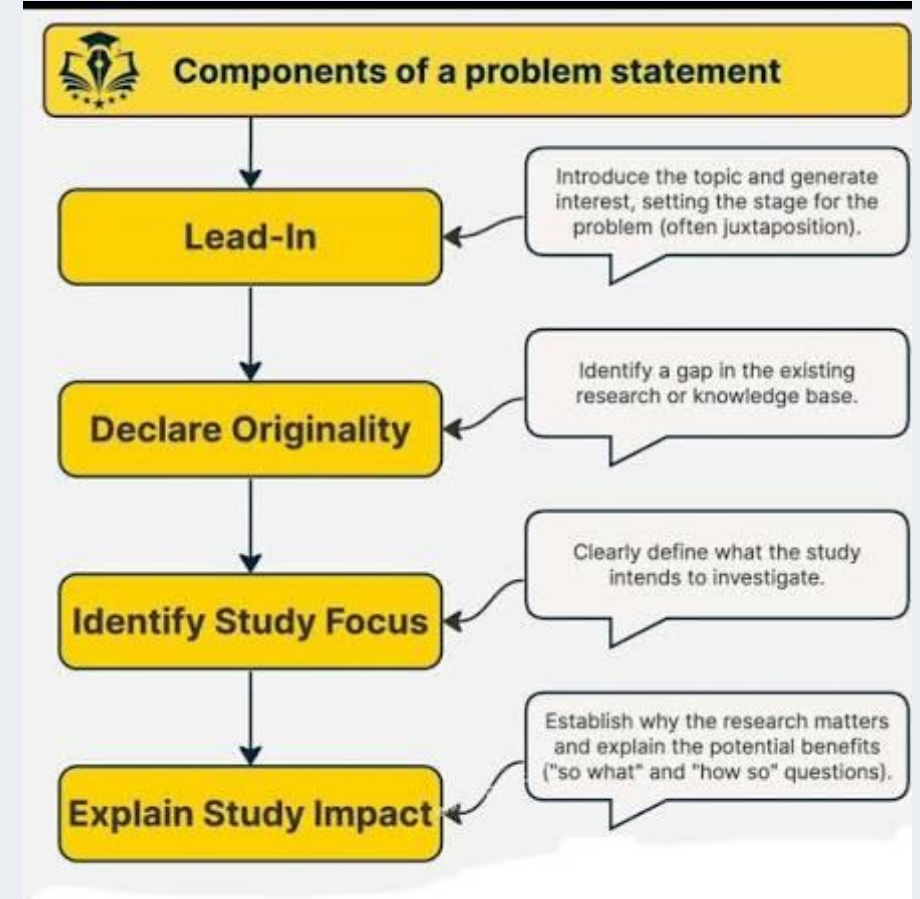
Existing grid forecasting approaches struggle with rapidly changing distributed energy resources.

Research gap

Limited research has integrated uncertainty-aware learning with real-time distributed forecasting under high DER penetration.

Research contribution

A validated framework that improves forecasting reliability under defined operating conditions.



The Research Question

A strong research question should be:

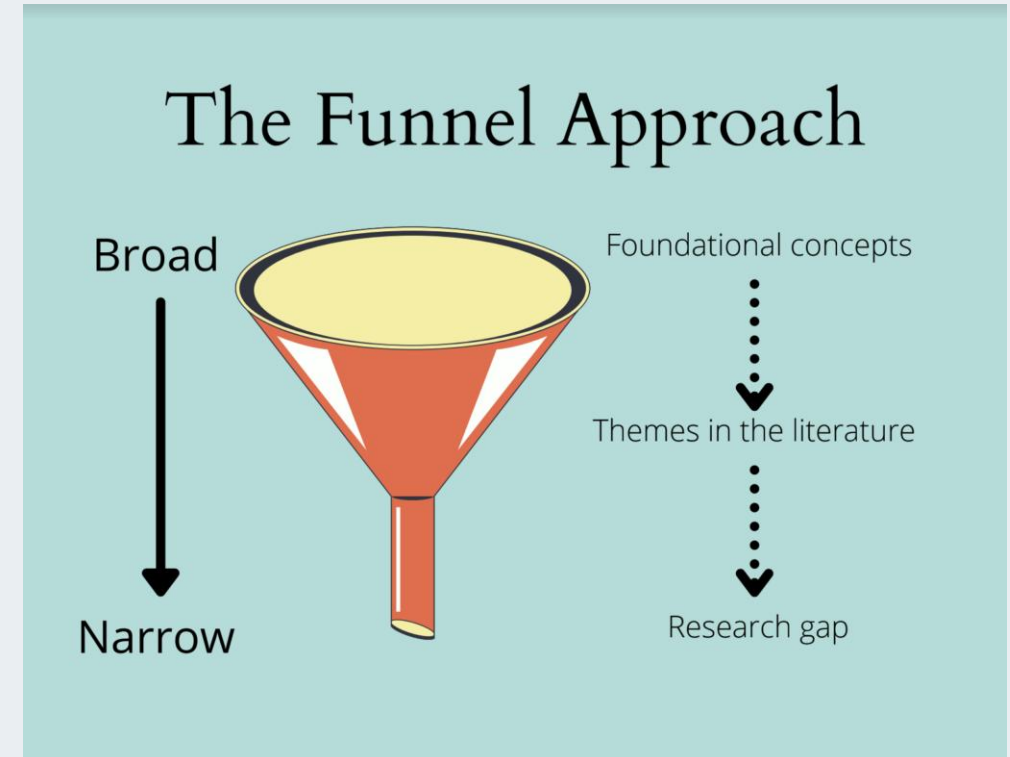
- Clear
- Focused
- Researchable
- Significant
- Answerable
- Aligned with methodology

Weak:

How can AI improve electricity systems?

Stronger:

How can uncertainty-aware machine learning improve short-term EV load forecasting under high distributed-energy-resource penetration?



Your One-Sentence Research Claim

Ask yourself?

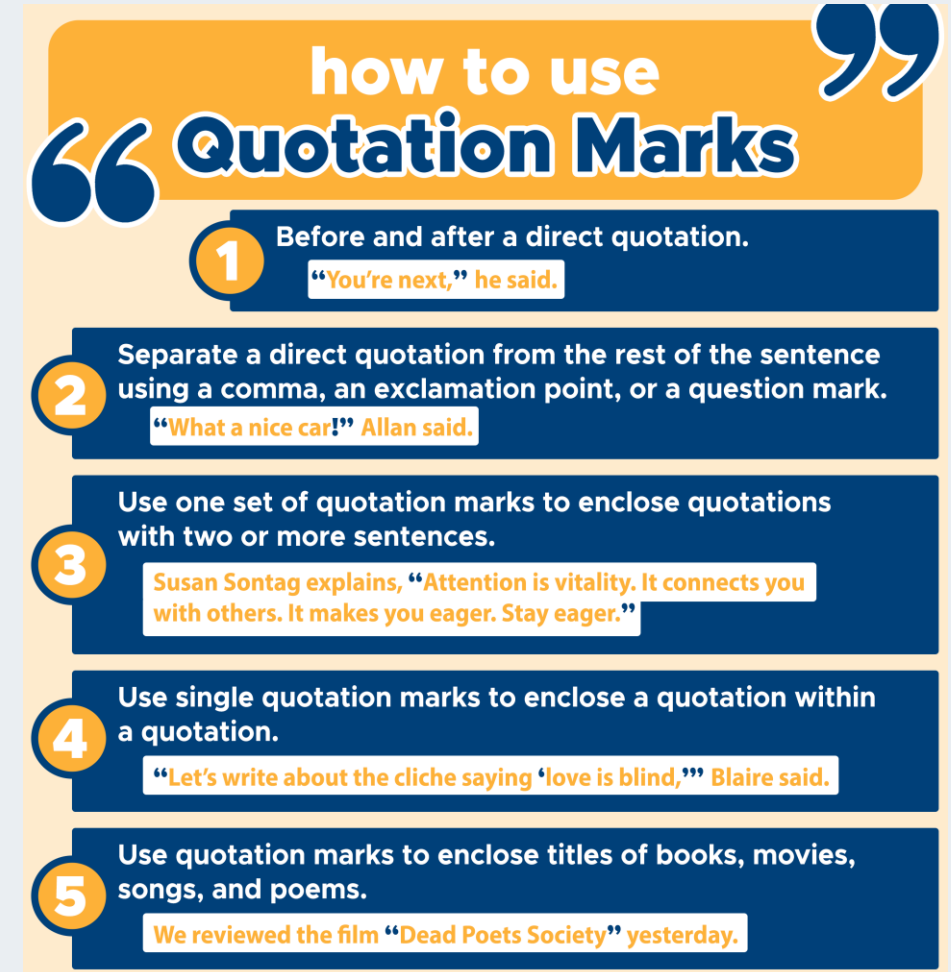
What is the single most important thing my research demonstrates?

Template:

“This research demonstrates that _____
can improve _____ under _____ conditions by _____.”

Example:

This research demonstrates that uncertainty-aware machine learning can improve EV load forecasting reliability under high DER penetration conditions by explicitly modelling predictive uncertainty.



how to use Quotation Marks

- 1** Before and after a direct quotation.
“You’re next,” he said.
- 2** Separate a direct quotation from the rest of the sentence using a comma, an exclamation point, or a question mark.
“What a nice car!” Allan said.
- 3** Use one set of quotation marks to enclose quotations with two or more sentences.
Susan Sontag explains, “Attention is vitality. It connects you with others. It makes you eager. Stay eager.”
- 4** Use single quotation marks to enclose a quotation within a quotation.
“Let’s write about the cliché saying ‘love is blind,’” Blaire said.
- 5** Use quotation marks to enclose titles of books, movies, songs, and poems.
We reviewed the film “Dead Poets Society” yesterday.

The “So What?” Test

After every major claim, ask:

So what?

- Why does this matter?
- What changes because of this finding?
- Who benefits?
- What knowledge has changed?
- What decision can now be made differently?

Discussion Chapter Anatomy

1. Summary of Key Findings
Restate the most important results concisely

2. Interpretation
What do the findings mean?

3. Relation to Existing Literature
How do they fit with prior research?

4. Implications
So what? Why does it matter?

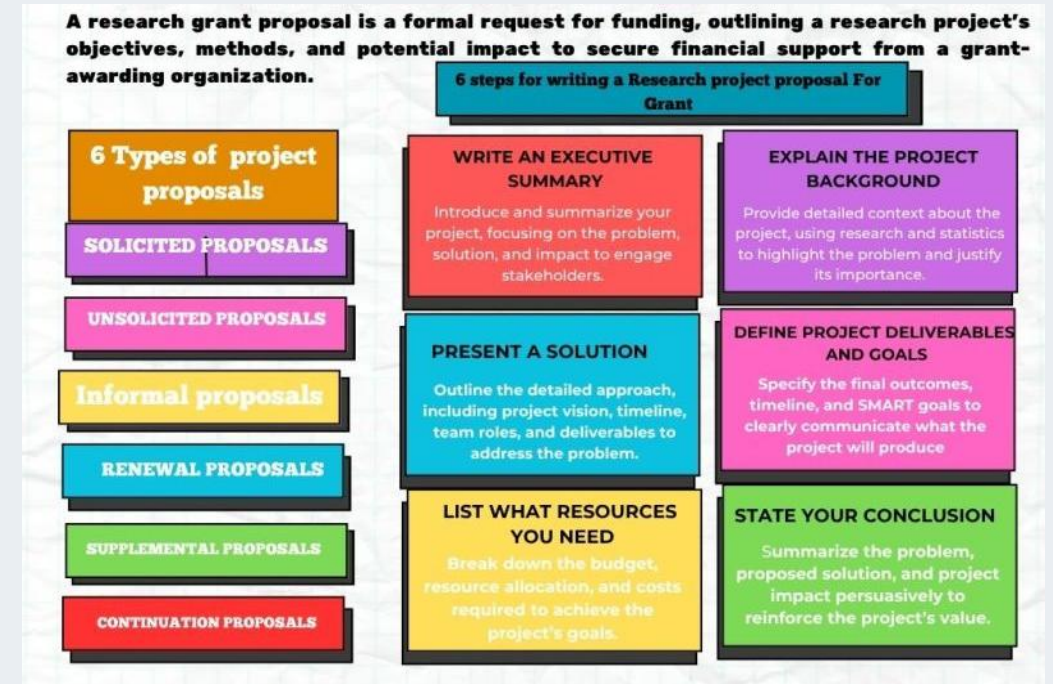
5. Limitations & Future Research
Acknowledge boundaries and next steps

PART II — WRITING THE RESEARCH PROPOSAL

The Research Proposal as a Persuasive Argument

A proposal should convince the reader that:

- The problem matters.
- A knowledge gap exists.
- The research is original.
- The research is feasible.
- The methodology is appropriate.
- The outcomes will contribute knowledge.



The Proposal Architecture

Typical structure:

- Title
- Background
- Problem statement
- Research gap
- Aim
- Research questions
- Objectives
- Literature review
- Conceptual framework
- Methodology
- Expected contribution
- Research significance
- Timeline
- References

Tips for Writing a Strong Research Proposal

01

Be Clear, Not Complicated

- Ditch the jargon
- Write like you're explaining it to a smart, skeptical friend
- Don't impress—convince

★ "If your reader can't understand it, they won't approve it."

02

Justify Your Methods

- Don't just list methods
- Show why they're appropriate
- Think: "Why is this the best approach to my question?"

★ Reviewers want to see thoughtfulness, not just checklists.

03

Show It's Feasible

- Be honest about:
- Timeline
 - Roadblocks
 - Resources
 - Then explain how you'll tackle them.

★ A great idea is only great if it's doable.

04

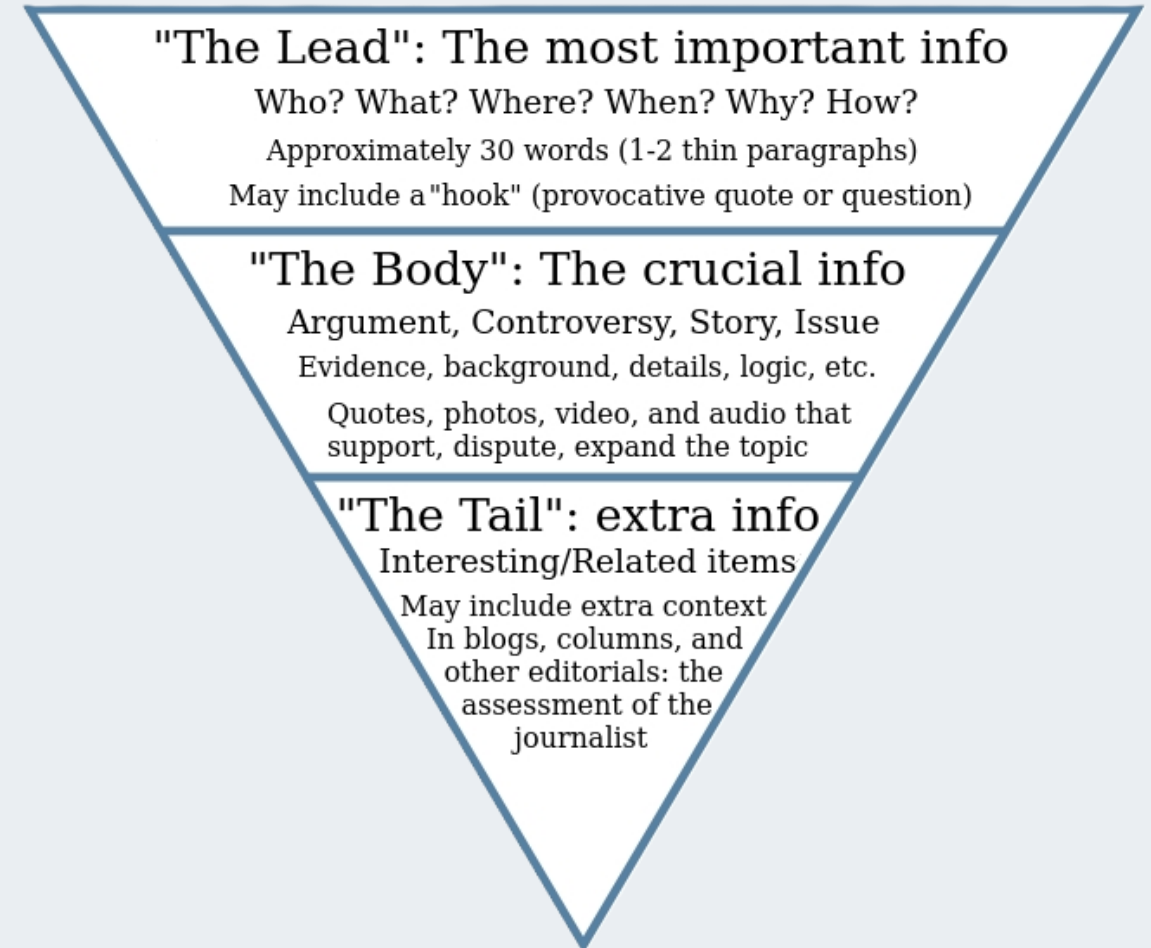
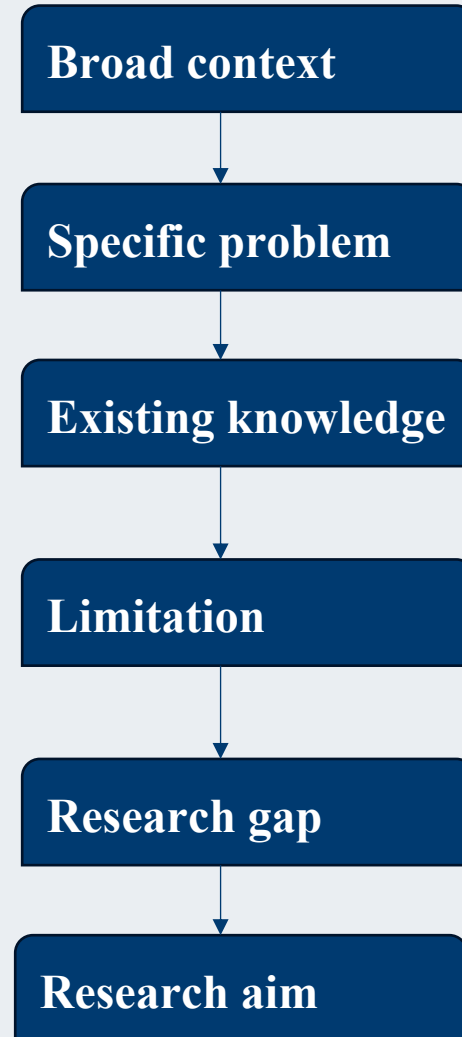
Edit Like a Pro

- Read it aloud
- Get feedback from a brutally honest friend
- Sleep on it, re-read with fresh eyes

★ If your proposal has typos, reviewers may think your research will too.

Writing the Introduction

A strong introduction
moves from:



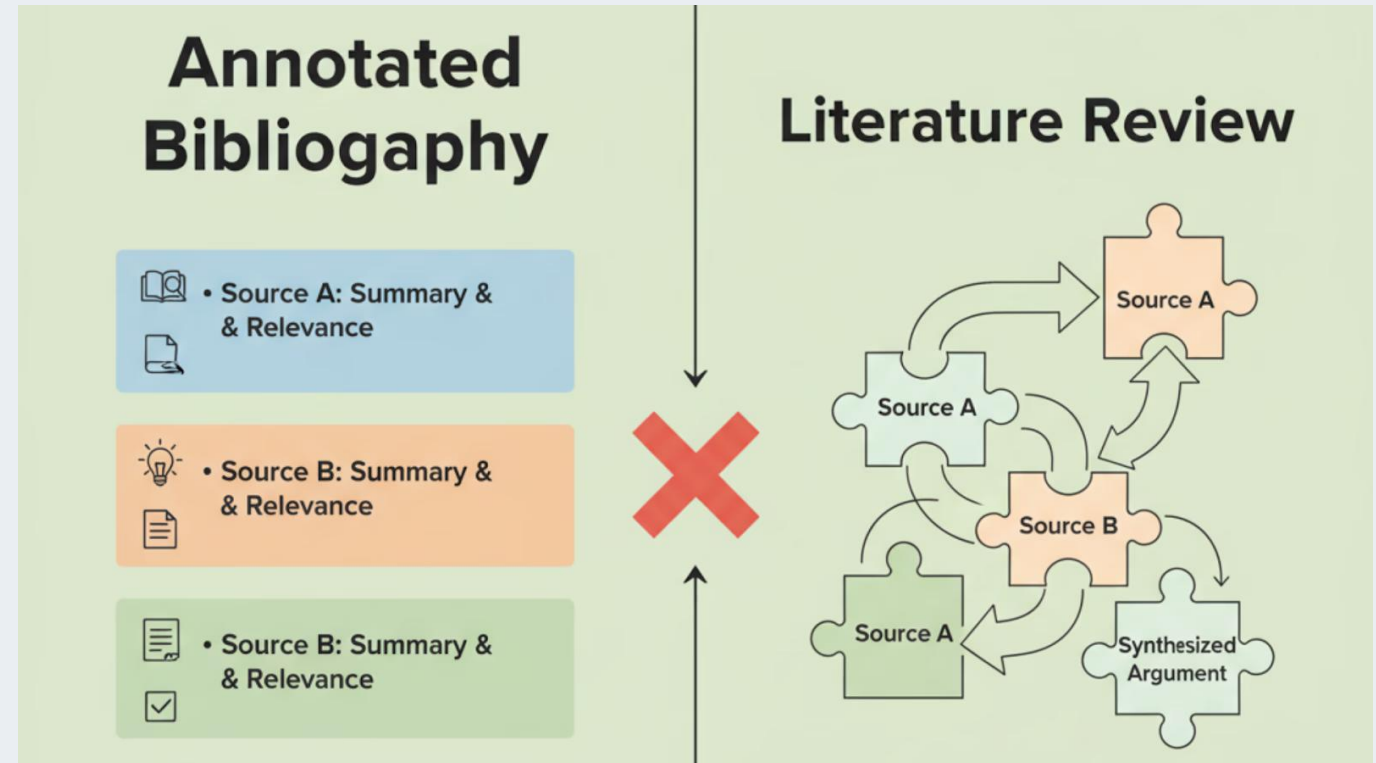
Writing the Literature Review

The literature review is NOT:

Paper A says X.
Paper B says Y.
Paper C says Z.

It IS:

What do we know?
What do we disagree about?
What approaches exist?
What are their limitations?
What remains unknown?



From Summary to Synthesis

Descriptive writing:

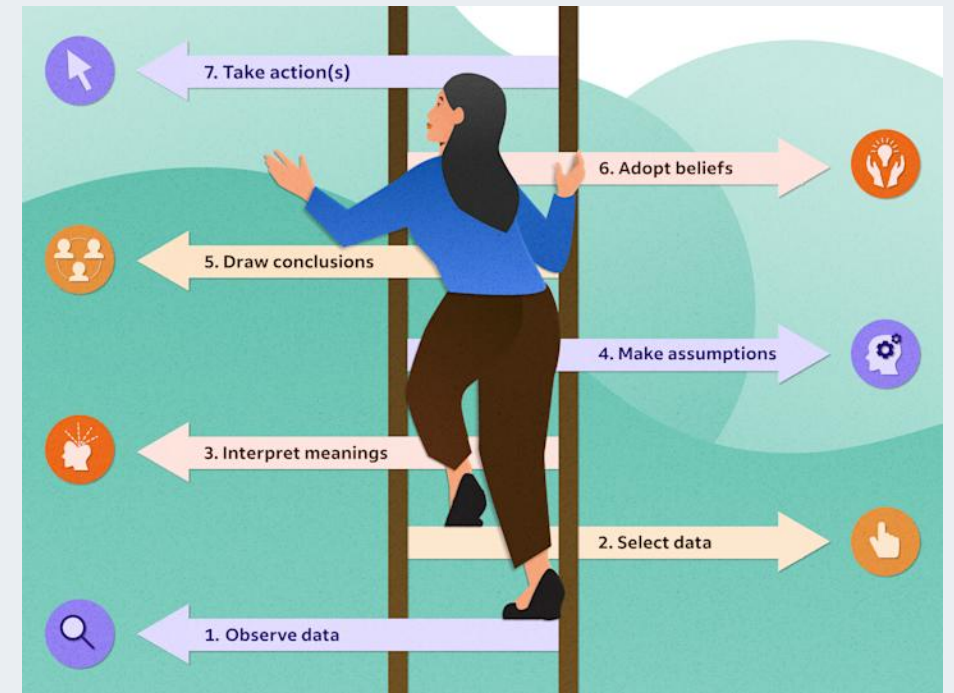
Smith used ANN. Jones used SVM. Ahmed used LSTM.

Analytical writing:

Although ANN and SVM approaches provide acceptable forecasting accuracy under stable operating conditions, LSTM-based models generally perform better when temporal dependencies become significant.

Critical writing:

However, these studies largely evaluate deterministic accuracy and provide limited treatment of uncertainty, reducing their usefulness for operational decision-making.

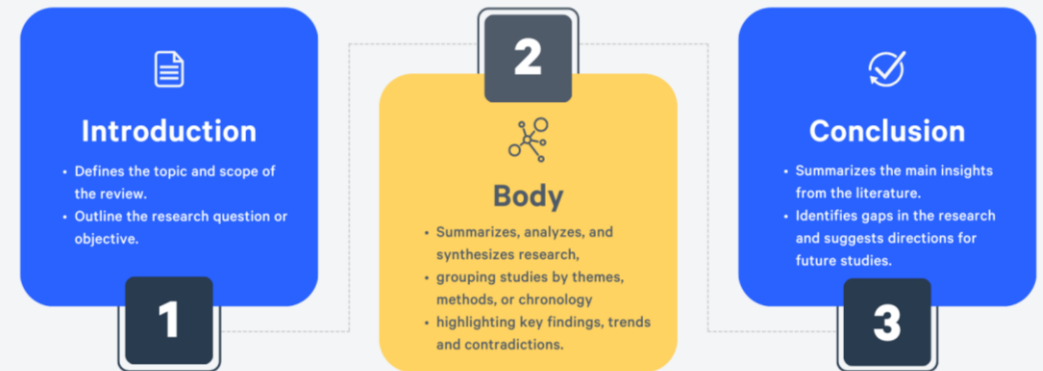


The “Critical Voice” in Academic Writing

Use language such as:

- However...
- Nevertheless...
- In contrast...
- This suggests...
- A limitation is...
- The evidence indicates...
- This remains unclear because...
- Existing studies have not adequately considered...
- A significant limitation concerns...

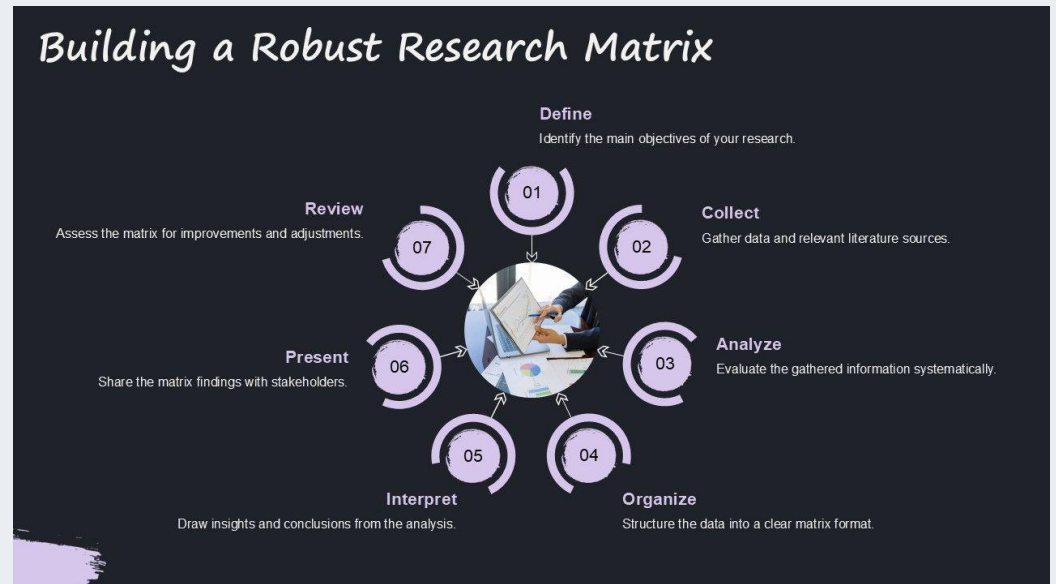
Key elements of a literature review



Building a Literature Matrix

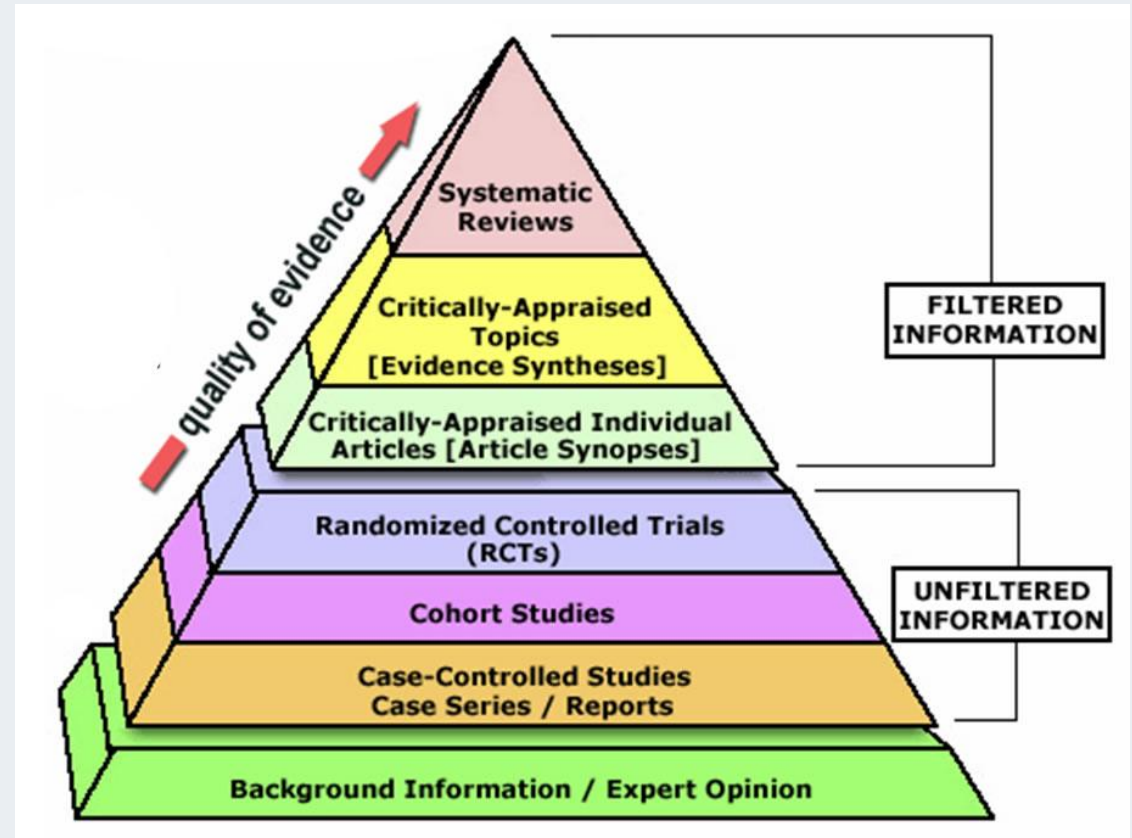
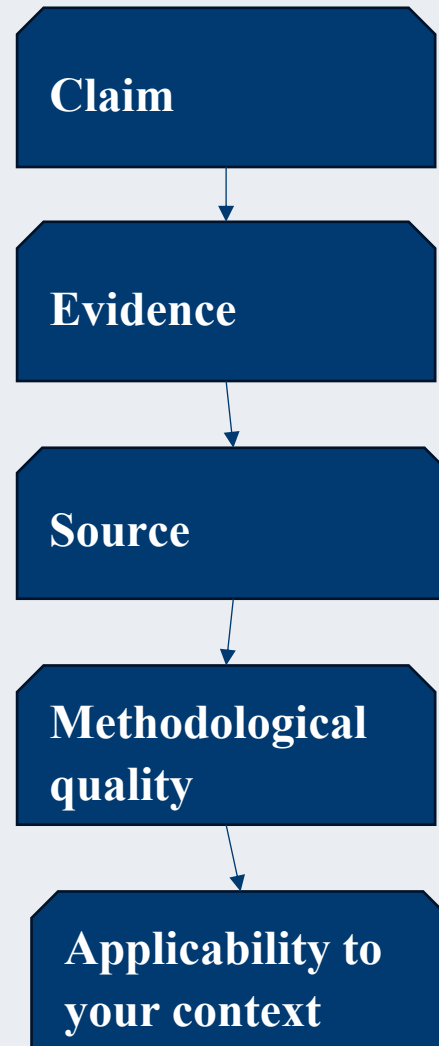
Useful columns:

Author	Problem	Method	Dataset	Key finding	Limitation	Research opportunity
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Evidence Hierarchy

When making an academic claim, consider:



PART III — WRITING TECHNICAL ENGINEERING RESEARCH

The Anatomy of a Strong Paragraph

A useful structure:

1. Topic sentence

What is this paragraph about?

2. Evidence

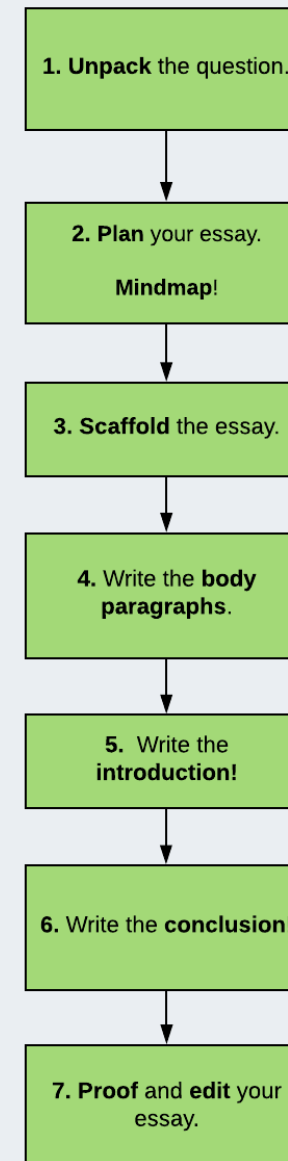
What supports the claim?

3. Analysis

What does the evidence mean?

4. Link

Why does it matter to the research argument?



One Paragraph, One Main Idea

Avoid:

One paragraph discussing:

- Solar generation
- Battery storage
- EVs
- AI
- Cybersecurity
- Market pricing

Prefer:

One paragraph → one coherent idea.



PARAGRAPH
planning

Writing Topic

Topic sentence

Identify a clear main point by outlining the topic you are writing about.

Supporting Sentences

Provide explanations, examples, or evidence to develop and strengthen your main point. Make sure each detail directly supports the topic sentence.

Concluding Sentence

Summarize the main idea or offer a final thought to wrap up the paragraph.

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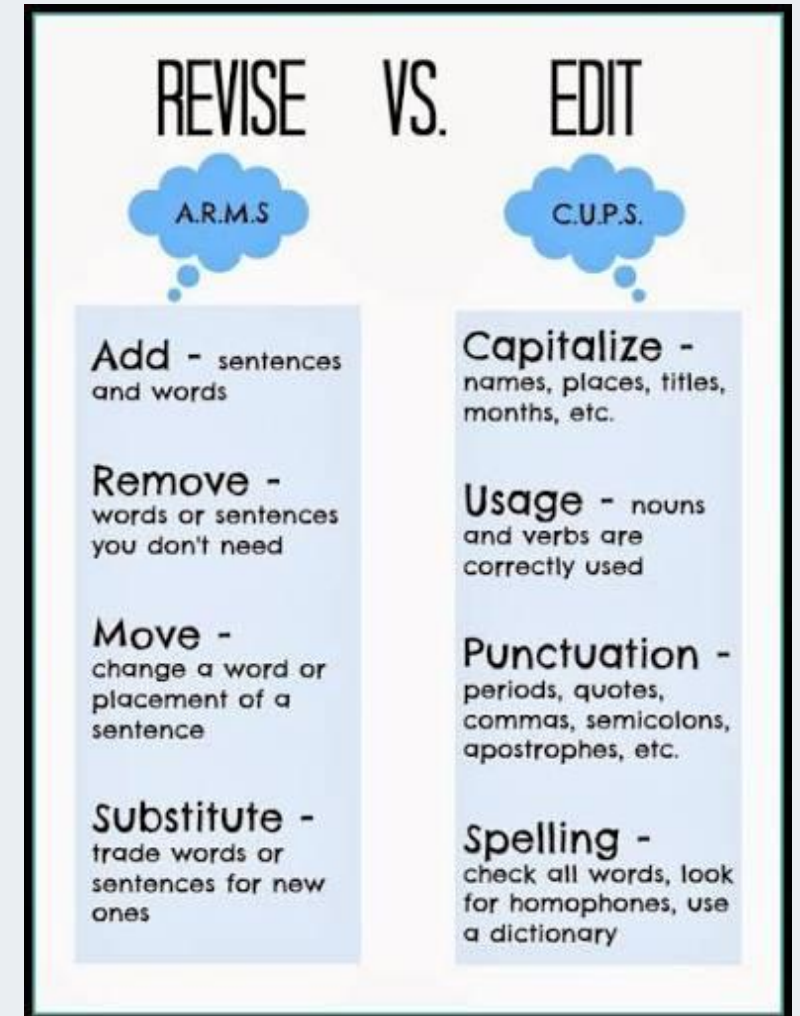
Sentence Design for Engineers

Prefer:

The proposed controller reduced voltage deviation by 18% under the tested operating conditions.

Rather than:

The results show a considerable improvement in the voltage profile achieved through the proposed methodology.



Active vs Passive Voice

Passive:

The experiment was conducted using three datasets.

Active:

We evaluated the model using three datasets.

Both can be appropriate.

Use whichever provides greater clarity.

Words that are
used to ~~COMPARE~~:

also
as well as
alike
both
just like
in common
similar to

Words that are used
to CONTRAST:

although
but
differs from
different
however
in contrast
on the other hand
than

Precision in Technical Language

Avoid vague terms:

- Significant
- Considerable
- Very high
- Very low
- Excellent
- Efficient
- Robust

Unless defined or supported.

Words to Avoid

Good

- Merit
- Value
- Benefit
- Advantageous

Bad

- Adverse
- Disadvantage
- Unpleasant
- Inadequate

Prefer:

The proposed method reduced RMSE by 14.2% compared with the baseline model.

Equations Are Part of the Argument

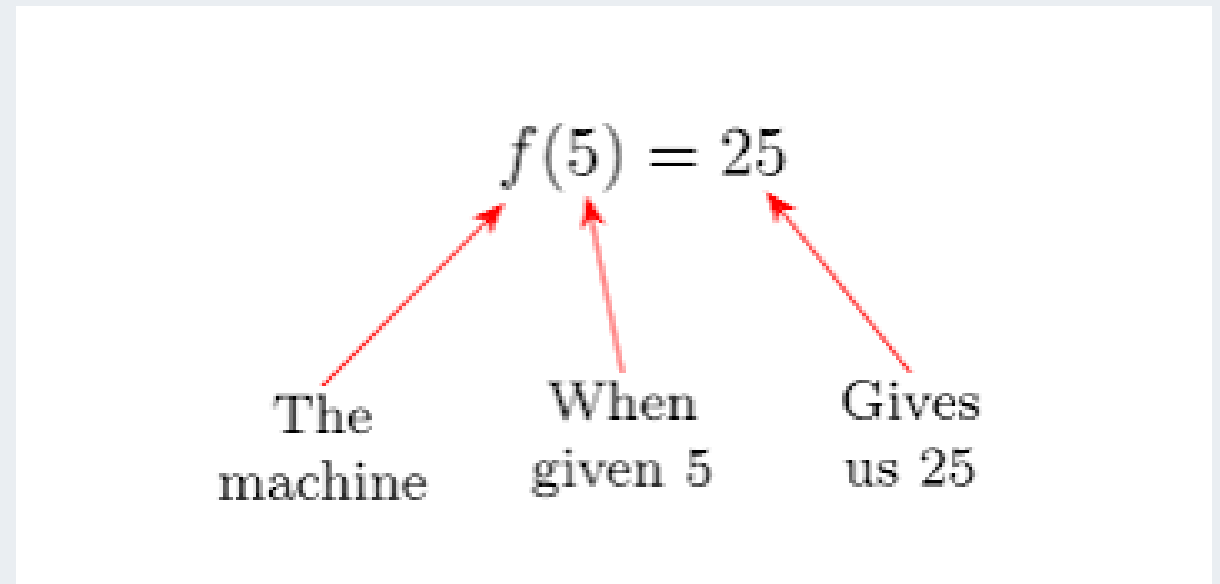
An equation should not appear without explanation.

Example:

$$\text{RMSE} = \sqrt{\frac{1}{N} \sum_{i=1}^N (y_i - \hat{y}_i)^2}$$

Explain:

- What does it measure?
- What each variable means?
- Why is it appropriate?
- How is it interpreted?



PART IV — FIGURES, TABLES AND DATA VISUALISATION

A Figure Should Tell a Story

Bad figure:

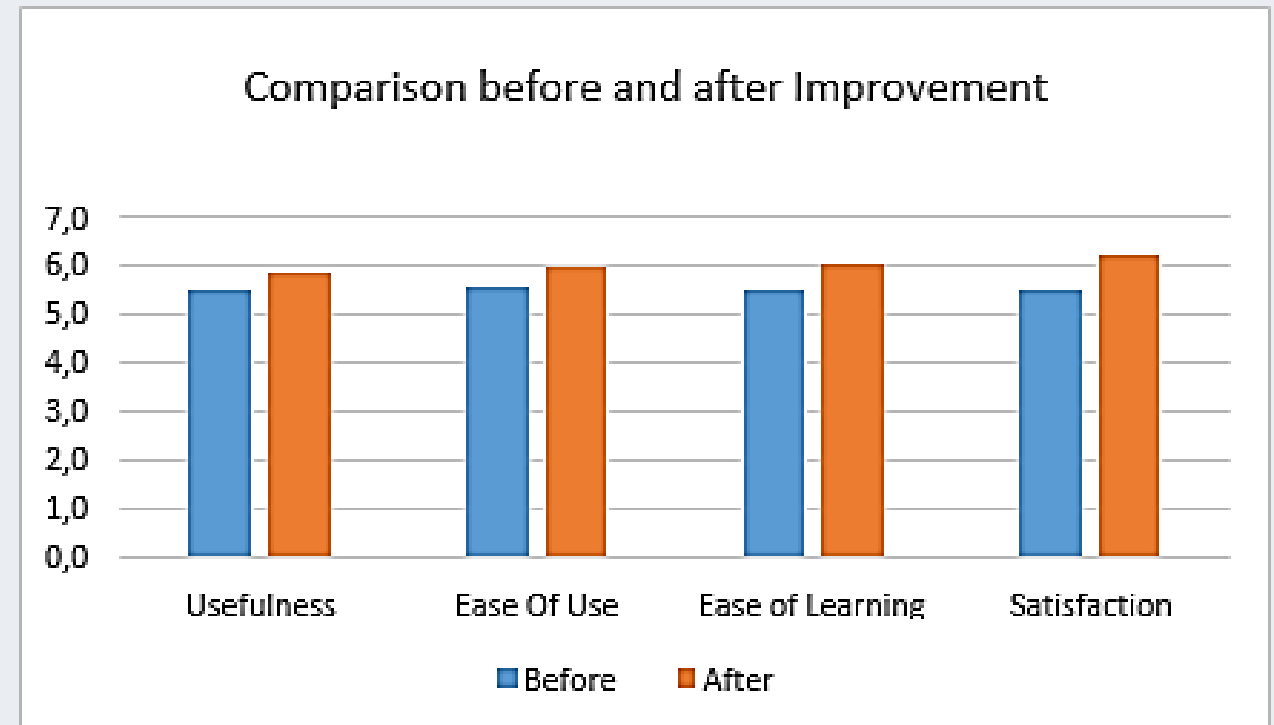
Too many lines, colours, labels and variables.

Good figure:

One clear message.

Ask:

“What should the reader notice first?”



Choosing the Right Graph

Line graph

→ Trends over time

Box plot

→ Distribution and variability

Bar chart

→ Compare categories

Heat map

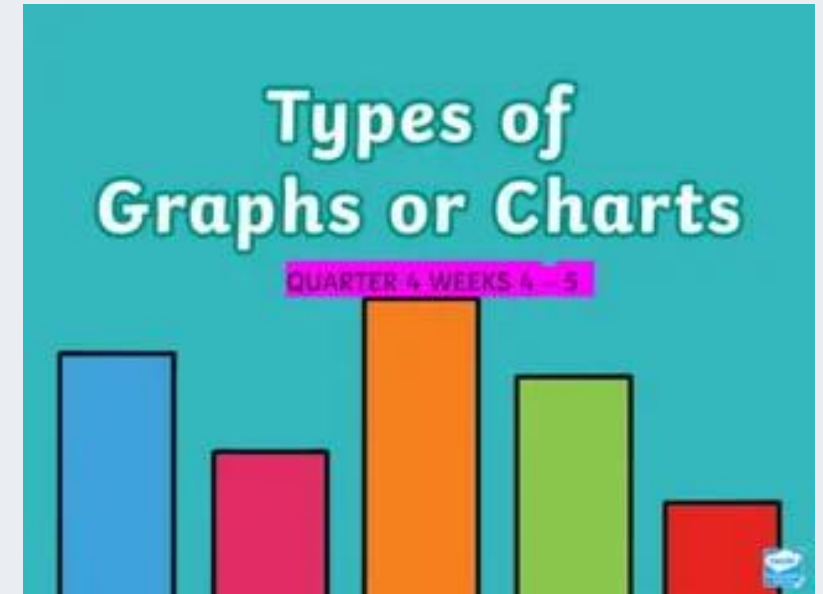
→ Patterns across two dimensions

Scatter plot

→ Relationships/correlation

Network diagram

→ Relationships and connectivity



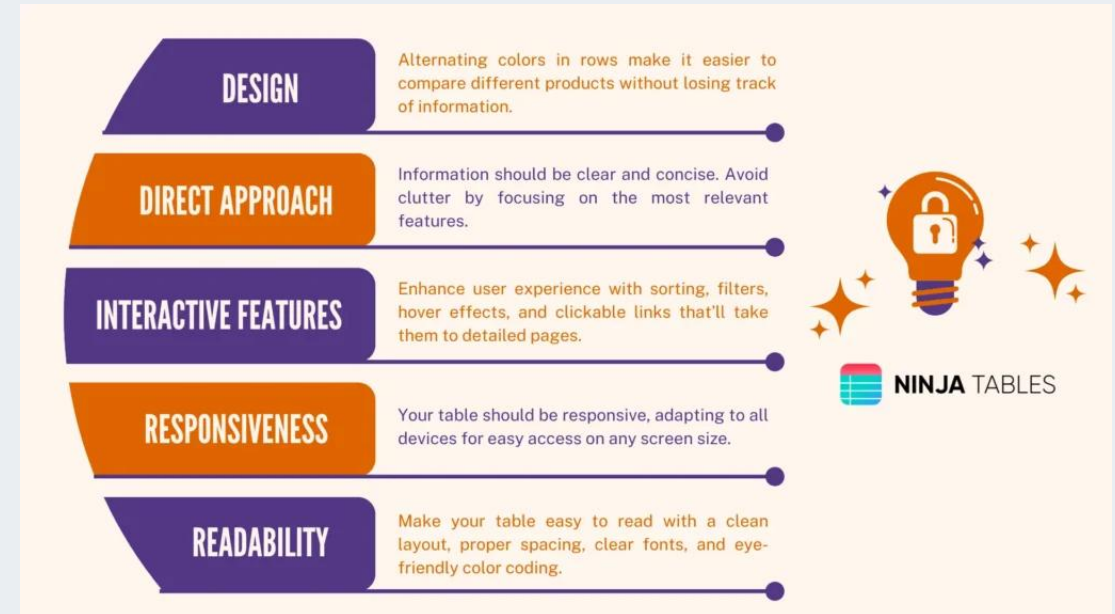
Tables: Information vs Overload

A table should allow the reader to answer:

What is the important comparison?

Avoid tables containing:

- Too many decimal places
- Redundant information
- Excessive columns
- Unexplained abbreviations



Visualising Engineering Results

Useful examples:

- System architecture diagrams
- Experimental setups
- Flowcharts
- Control block diagrams
- Heat maps
- Performance curves
- ROC curves
- Confusion matrices
- Power-flow diagrams
- Network topologies



Figure Captions Matter

Weak:

Figure 5: Results.

Better:

Figure 5: Forecasting RMSE under three EV charging penetration scenarios.

Best captions help the reader understand:

- What is shown?
- Under what conditions?
- What comparison is being made?

Traditional

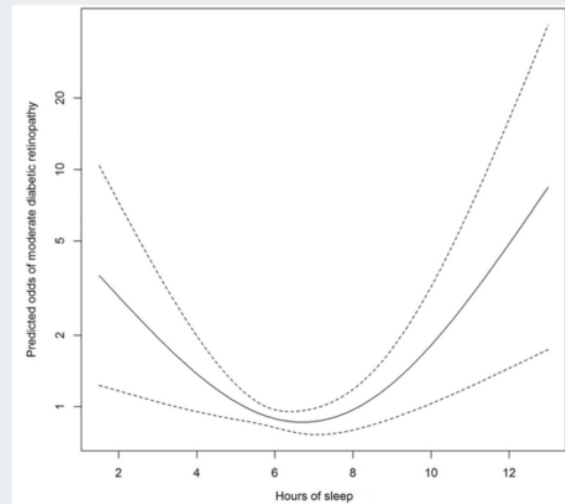


Fig. 1. Multivariable-adjusted odds of moderate diabetic retinopathy according to sleep duration.

New style

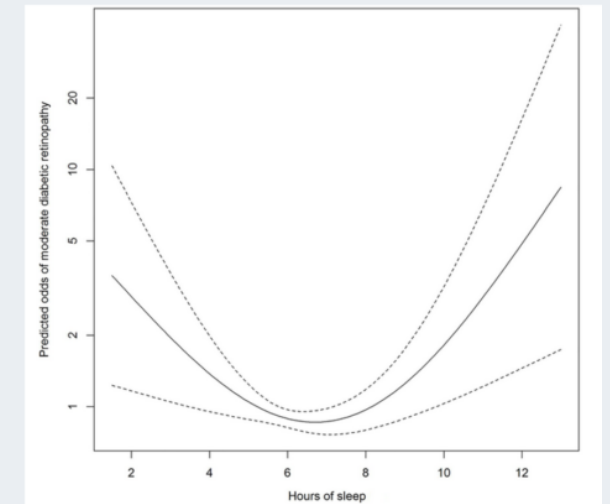


Fig. 1. A total sleep duration of 6–8 h per day was associated with the lowest risk of moderate diabetic retinopathy.

VS.

The Figure–Text Relationship

Do not simply insert a figure.

Introduce it

Figure 4 illustrates the proposed architecture.

Explain it

The forecasting module receives historical load and weather data.

Interpret it

The architecture enables uncertainty estimation alongside point forecasts.

CIRCUIT BREAKER KNOWLEDGE				
IMAGE	NAME	SHORT CIRCUIT	OVER LOAD	EARTH LEAKAGE
	CB Circuit Breaker	✓	✓	✗
	MCB Miniature Circuit Breaker	✓	✓	✗
	ELCB Earth Leakage Circuit Breaker	✗	✓	✓
	RCBO Residual Current Breaker Overload	✓	✓	✓

PART V — WRITING THE RESEARCH PAPER

The IMRaD Structure

Many engineering papers follow:

- I — Introduction
- M — Methods
- R — Results
- a — and
- D — Discussion

Often followed by:

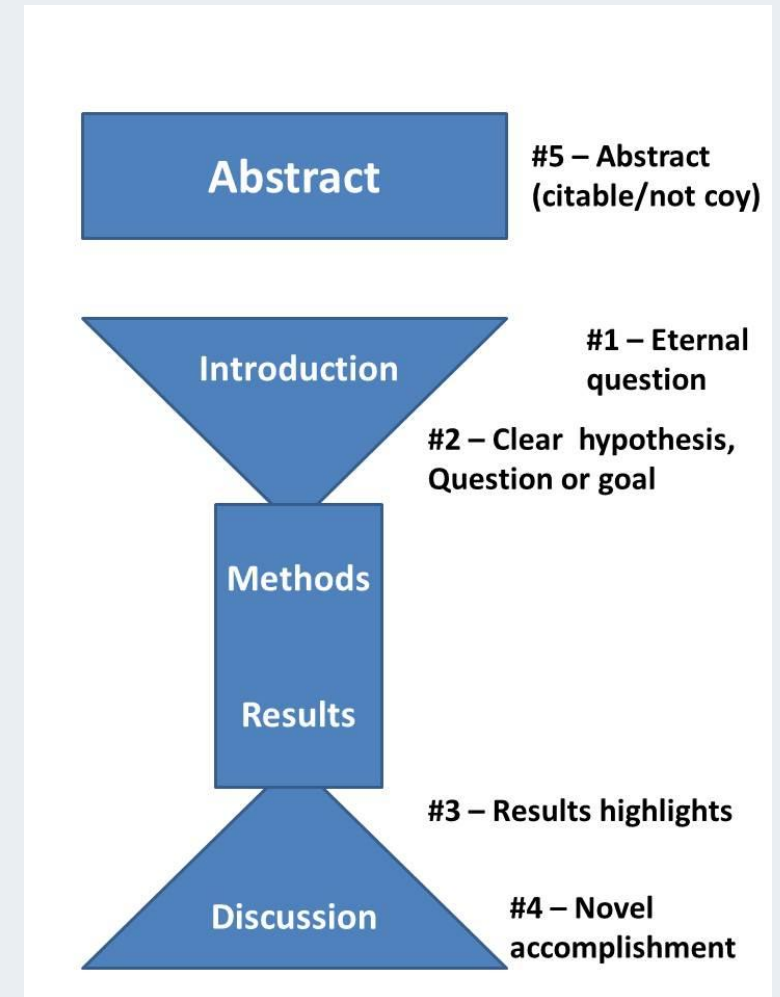
- Conclusion
- Limitations
- Future work



Writing the Abstract

A strong abstract answers five questions:

- What problem?
- Why important?
- What method?
- What was found?
- What is the contribution?



The Abstract as a “Mini-Paper”

A useful structure:

Problem: Existing approaches...

Gap: However...

Method: This study proposes...

Result: Results demonstrate...

Contribution: The study contributes...



Writing the Results Section

Results answer:

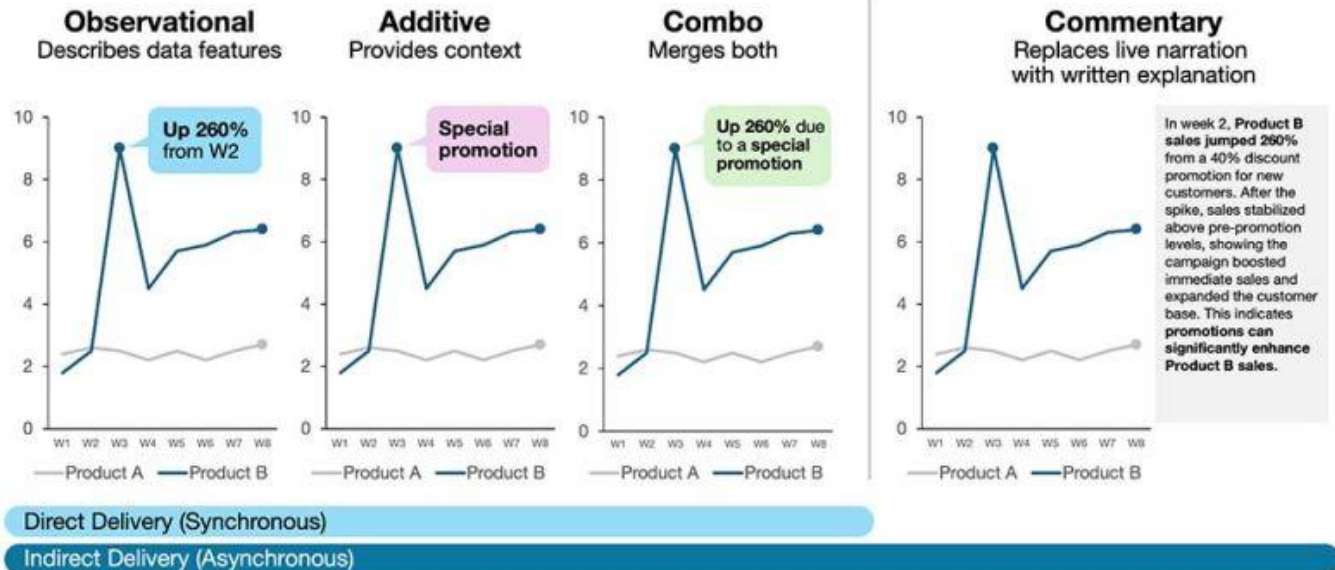
What did you observe?

Report:

- Experimental outcomes
- Statistical results
- Model performance
- Comparisons
- Trends
- Unexpected findings

Do not over-interpret yet.

Three types of chart annotations (+ commentary)



Writing the Discussion

The discussion answers:

What do the results mean?

Consider:

- Why did this happen?
- Does it agree with previous studies?
- Why does it differ?
- What are the implications?
- What are the limitations?
- Under what conditions does the finding apply?

HOW TO WRITE A STRONG DISCUSSION SECTION FOR YOUR MANUSCRIPT

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Summary of Key Findings	Here, briefly restate the main result. Try not to repeat the whole Result Section.
Interpretation of Findings	Explain the significance of your results & how they relate to your research question.
Comparison with Previous Research	Discuss how your findings align with or differ from existing studies/literature
Implications/ Significance of the Study	Highlight the theoretical, practical, or policy implications of your research.
Strengths/ Contributions	Emphasise the novelty & strengths of your work.
Limitations of Study	Acknowledge any limitations/ potential biases in your study
Future Work/ Opportunities for Research	Based on your findings, suggest areas for further research
Conclusion	Provide a concise summary that reinforces the overall importance of your study

Results vs Discussion

Results	Discussion
What happened?	Why did it happen?
What was measured?	What does it mean?
What was observed?	Why is it important?
What did the experiment show?	How does it compare with literature?

5 DIFFERENCES BETWEEN THE RESULTS AND DISCUSSION SECTIONS		
The Results and Discussion sections of your research paper play different roles. You need to understand the differences between both before you start writing them.		
	RESULTS SECTION	DISCUSSION SECTION
	This section answers the question "WHAT" about your research	This section answers the question "SO WHAT" about your research
	Describes the experiments completed before the paper was written	Summarizes and interprets the significance of the main findings of your study
	States the results but does not interpret them	Interprets the results but does not restate the results
	Includes only that data which will be relevant to the discussion section	Doesn't introduce any new results in this section; so don't make statements your results can't support
	Uses the simple past tense	Uses both the past and the present tense as required
	You can include non-textual elements such as tables, figures, and images	Use only text although you can also refer to the non-textual elements
    		

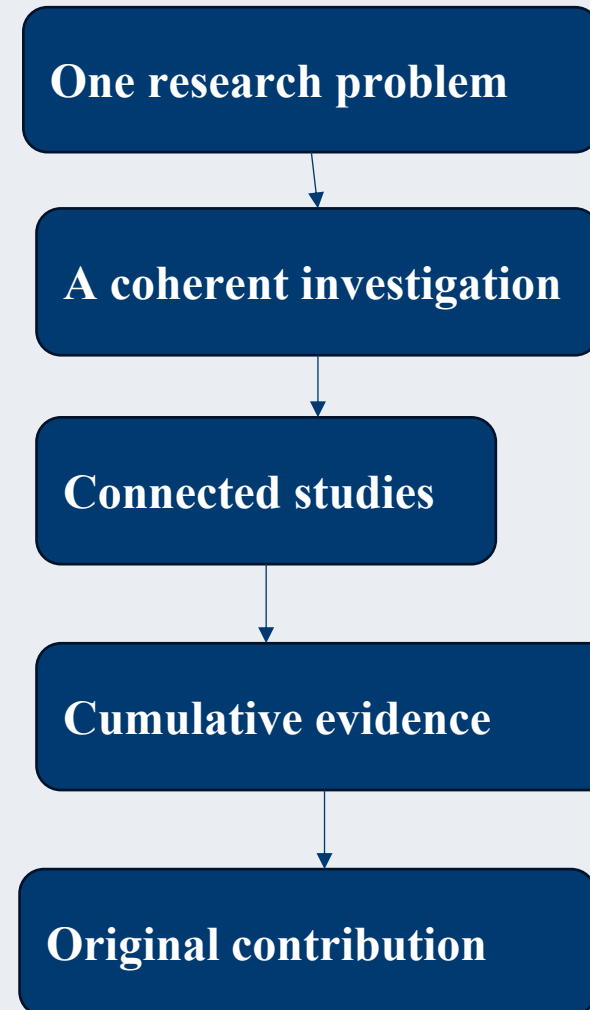
PART VI — THESIS WRITING

The Thesis Is One Argument

A thesis is not:

Five unrelated papers bound together.

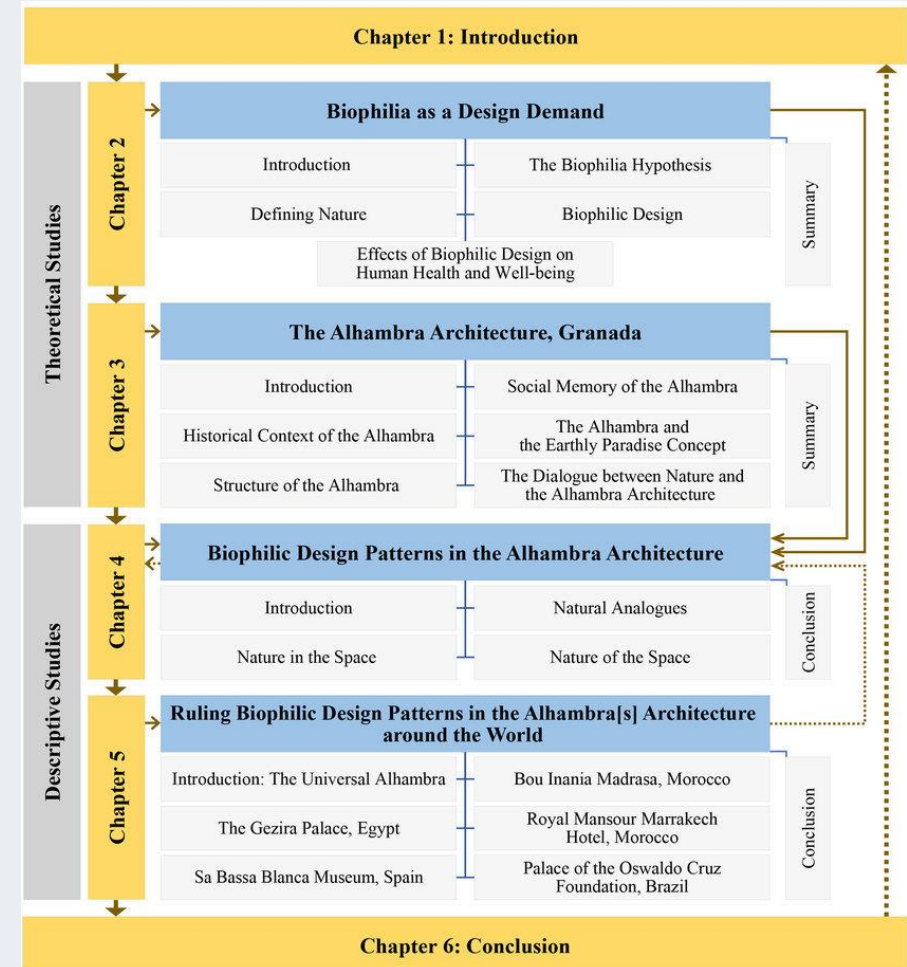
It should communicate:



The Thesis Chapter Architecture

Typical structure:

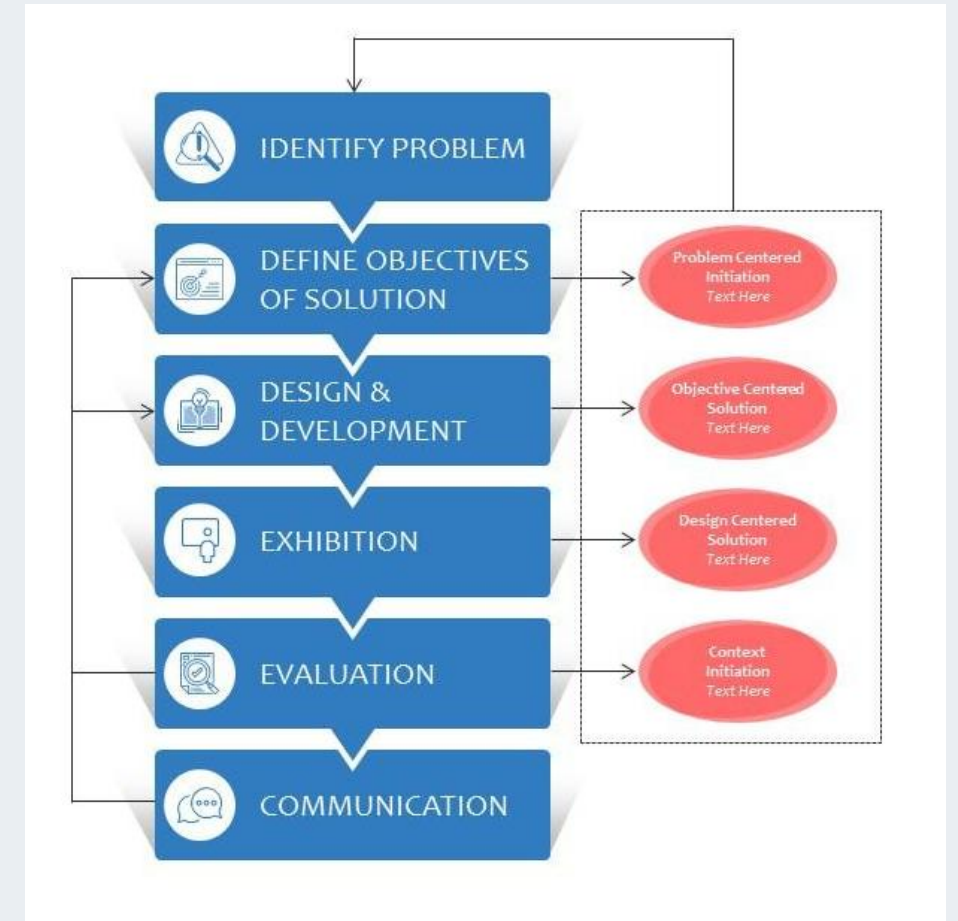
1. Introduction
2. Literature Review
3. Methodology
4. Results/Study 1
5. Results/Study 2
6. Results/Study 3
7. Discussion
8. Conclusions and Contributions



Writing the Methodology

A strong methodology allows the reader to understand:

- What was done?
- Why was it done?
- How was it done?
- What assumptions were made?
- What data were used?
- How was validity established?
- Could another researcher reproduce it?



Reproducibility and Research Transparency

Document:

- Datasets
- Parameters
- Algorithms
- Experimental conditions
- Hardware/software
- Evaluation metrics
- Assumptions
- Random seeds where relevant
- Version information



PART VII — GENERATIVE AI AND RESEARCH COMMUNICATION

Generative AI: Assistant, Not Author

Generative AI can assist with:

- Brainstorming
- Structure
- Language refinement
- Summarisation
- Coding support
- Translation
- Alternative explanations
- Presentation preparation

But the researcher remains responsible for:

- Accuracy
- Originality
- Evidence
- Interpretation
- Citations
- Research integrity

AI-Generated Text: The Verification Problem

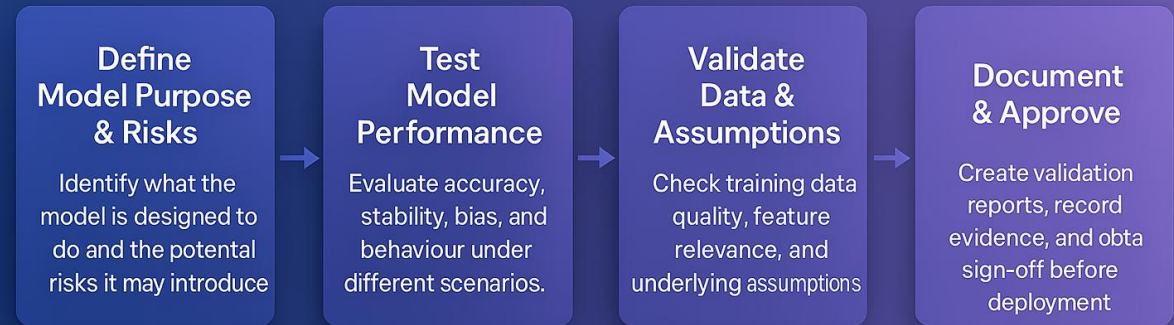
AI may produce:

- Incorrect references
- Fabricated citations
- Plausible but false explanations
- Unsupported claims
- Incorrect equations
- Inappropriate terminology
- Overconfident conclusions

Rule:

Never outsource scholarly judgement to an AI system.

AI Model Validation – Simple Compliance Flow



A simple overview of how AI models are validated to ensure reliability, fairness, and regulatory compliance.

Final Message:

Become the Author of Your Research Story

Remember:

- Good research asks an important question.
- Good engineering research produces credible evidence.
- Excellent doctoral research explains why that evidence matters.

And:

Your thesis is not simply a record of what you did. It is your argument about what the world now knows that it did not know before.

Thank You!

Upcoming courses

Courses	Start Date
Doctor of Engineering (online) 36 months	8 February 2027
On-Campus – Doctor of Engineering 36 months Perth/Melbourne	15 February 2027

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