



Mastering the Literature Review

Thesis Workshop – Office of Graduate Studies

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The Literature Review: What is it?



Purpose

To systematically locate, evaluate, and synthesize existing research.



Goal

To establish a foundation for your research and position your work within the broader field.



Function

It is not a summary; it is a synthesis of what is known.

A summary **lists** papers. A synthesis **connects** them.

The Literature Review: What is it?



A literature review is not just a summary of papers you find. It's a synthesis of existing knowledge that allows you to:



Understand the landscape

Find out what is known and what is not known about your topic.



Identify the “gap”

Pinpoint where your research can make a unique contribution.



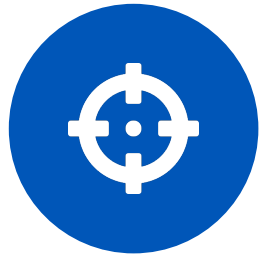
Avoid reinventing the wheel

Learn from the successes and failures of others.



Think of it as building a house. You wouldn't start laying bricks without the blueprint. **The literature review is your blueprint.**

The Structured Literature Review Process



STEP 1

Define Scope & Keywords

Break your problem into key concepts and search terms



STEP 2

Search & Discover

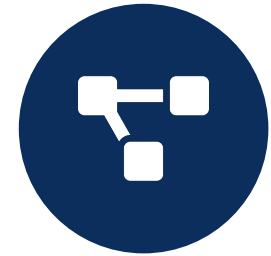
Query academic databases strategically



STEP 3

Screen & Select

Filter by title, abstract, introduction and conclusion



STEP 4

Synthesize & Analyze

Connect themes, contradictions and gaps

This isn't just about finding papers; it's about building a clear, organized understanding of your topic.

Define Scope and Keywords



Before you even open a search engine, be precise: break your research problem down into key concepts.



EXAMPLE PROBLEM

“Investigating the security vulnerabilities of IoT devices in smart home environments.”



KEYWORDS

IoT security

smart home

vulnerabilities

penetration testing

network security



Tip: consider synonyms and related terms to broaden your results, e.g. “IoT” / “Internet of Things”.

Search and Discover



You can't rely on just one source. Use academic databases designed for research:



IEEE Xplore

Primary resource for electrical engineering, electronics and computer science.



ACM Digital Library

Computer science research on networking, data communication and cybersecurity.



Google Scholar

Broad search across all disciplines; great for starting out and finding key authors.

Search strategically with Boolean operators

AND narrows results

OR broadens results

NOT excludes terms

Example: ("IoT security" AND "smart home") NOT ("industrial IoT")

Screen and Select



You will find a lot of papers and won't have time to read them all. Screen them quickly for relevance:

1 Title

- Is it directly related to your topic?

2 Abstract

- Does it cover the problem, methodology and key findings you're looking for?

3 Intro & Conclusion

- What is the main argument, and how does it fit into the broader field?

★ Good candidate

If a paper passes these three tests, **you've found a good candidate.**

Managing Your References



Save every paper you keep from day one. Rebuilding a reference list at the end of your thesis is slow and error-prone.



Zotero

Free & open source

Saves papers from your browser in one click.



Mendeley

Free

Built-in PDF reader for highlighting and notes.



EndNote

Commercial

Well suited to very large libraries.



All three insert citations as you write in Word and format your reference list in IEEE, APA or any other style automatically.



Tip: tag papers by theme as you save them. Your tags become the sections of your review.

Synthesize and Analyze



This is the most critical step. Your goal is not to list papers, but to find connections, trends, and conflicts.



Identify Key Themes

Are several papers proposing a similar solution? Is there a common debate, or an overlooked topic?



Look for Contradictions

Do two highly cited papers report conflicting results? A great place to find a gap.



Acknowledge Limitations

What did authors say they didn't investigate? It often points to a new research problem.



Organize it with a literature matrix

A simple table with columns for author, year, research question, methodology, key findings and limitations.

Literature Matrix



A literature matrix

also called a literature review matrix or a synthesis matrix

A tool to systematically organize and synthesize information from multiple research papers.

Essentially a table or spreadsheet that keeps track of the key details, findings and methodologies of every source you review.

Paper	Method	Findings	Limits
Paper 1	—	—	—
Paper 2	—	—	—
Paper 3	—	—	—
Paper 4	—	—	—

Rows = papers · **Columns** = what you extract

Literature Matrix

Move beyond summarizing each paper one by one. Placing information side by side makes it much easier to:



Identify Trends

See patterns or common themes across multiple studies.



Spot Contradictions

Find conflicting results or disagreements among researchers.



Identify Gaps

Pinpoint areas that have been overlooked or under-researched.



Compare Methodologies

Analyze the different methods used to study the same problem.

How a Literature Matrix is Structured

The structure can vary, but typically **each row is one paper** and **each column is a piece of information** you extract from it.

	Author(s) & Year	Purpose / Research Question	Methodology	Key Findings	Limitations / Future Work
What to record	<i>To easily cite the source</i>	<i>The main goal of the study</i>	<i>Research design, e.g. experiment, survey, simulation</i>	<i>The main results of the study</i>	<i>Acknowledged weaknesses or recommendations</i>
Paper 1					
Paper 2					
Paper 3					



Fill it in as you read: it becomes a clear, visual overview of the literature and your first step to finding the gap.

Literature Matrix

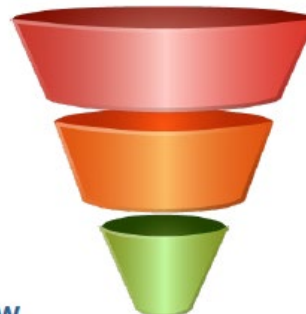


Authors	Study parameter	Experimental response	Optimization method
(Lin et al. 2013)	N atom and calcination temperature	XRD, BET, TG-DTA, TEM, optical property, and ethylene photooxidation	One parameter at a time approach
(Dunnill et al. 2011)	Sintering temperatures and dopant concentrations.	UV-Visible-NIR, XRD, Raman, FT-IR and Rate of stearic acid destruction	None
(Yu et al. 2007)	Acidity of the solution of precursor, calcination temperature,	photodegradation of methylene blue (MB), XRD, and TEM	One parameter at a time approach
(Nosaka et al. 2005)	Nitrogen source compound, calcination temperature	XRD, XPS, DRS, and decomposition of propanol	None
(Wang et al. 2011)	Source of precursor	photocatalytic oxidation of propylene, XRD, XPS, DRS, and ESR	None

Reader knows



Reader doesn't know



**Introduce the field:
broad focus**

**Focus on certain aspects
in field of interest**

**End with gap
analysis**

Activity – Locating High-Quality Literature



8 minutes



In pairs



Your own thesis topic

1

Keywords

Write 3–4 key concepts and one synonym for each.

2

Search string

Combine them with AND / OR / NOT, e.g. ("IoT security" OR "smart home") AND vulnerability

3

Search

Run it in IEEE Xplore, ACM Digital Library or Google Scholar.

4

Screen

Apply the title – abstract – introduction/conclusion test to the first five results.

5

Share

One strong paper you found, and why it made the cut.

The “Gap”: Where Innovation Happens?



Contradictions

Find papers with conflicting results.



Limitations

Look at what authors say they didn't investigate.



Under-researched Areas

Topics that are new or haven't been studied in depth.



Future Work

What authors recommend for future research.



Your research is the missing piece.

The best place to find a research problem is within the existing literature itself.

Using AI Tools Responsibly



Where AI can help



Discovery

Elicit, Consensus and Semantic Scholar suggest relevant papers and summarize abstracts.



Mapping

Connected Papers and ResearchRabbit show how studies cite each other and who the key authors are.



Where to be careful



Fabricated references

General chatbots can invent papers, authors and DOIs. Verify every source in a database.



Reading

An AI summary is not a substitute for reading the paper. Read it before you cite it.



Integrity

Follow UDST's academic integrity and AI-use guidelines, and disclose AI use where required.

Key Takeaways



1

Synthesize, don't summarize: Your review is an argument about what is known, not a list of papers.

2

Follow a process: Scope → Search → Screen → Synthesize.

3

Organize as you go: A literature matrix and a reference manager will save you weeks later.

4

The gap is your goal: Contradictions, limitations and future work point to your contribution.

5

Verify everything: Use AI to discover, never to replace reading and checking your sources.



Your literature review is the blueprint for your thesis. Build it before you lay the first brick.



Thank you



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