

Research Methodology in Computer Science (AI800)

Lecture 2

Introduction to literature Review (Part 1)



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Learning Outcomes

- To understand the purpose and basic requirements of literature review.
- To learn tips for organizing an effective literature review.
- To identify potential goals for conducting a literature review.
- To help you on develop strategies for inventing, organizing, and drafting a literature review.
- To become familiar with the steps of a literature review



Overview

Research may be done alone – but it is never done in **isolation**. The **production of new** knowledge is fundamentally **dependent** on past knowledge



I not only use all the
brains that I have,
but all I can borrow.

~Woodrow Wilson



Writing an Effective literature Review

Before starting your research, ask the following questions:

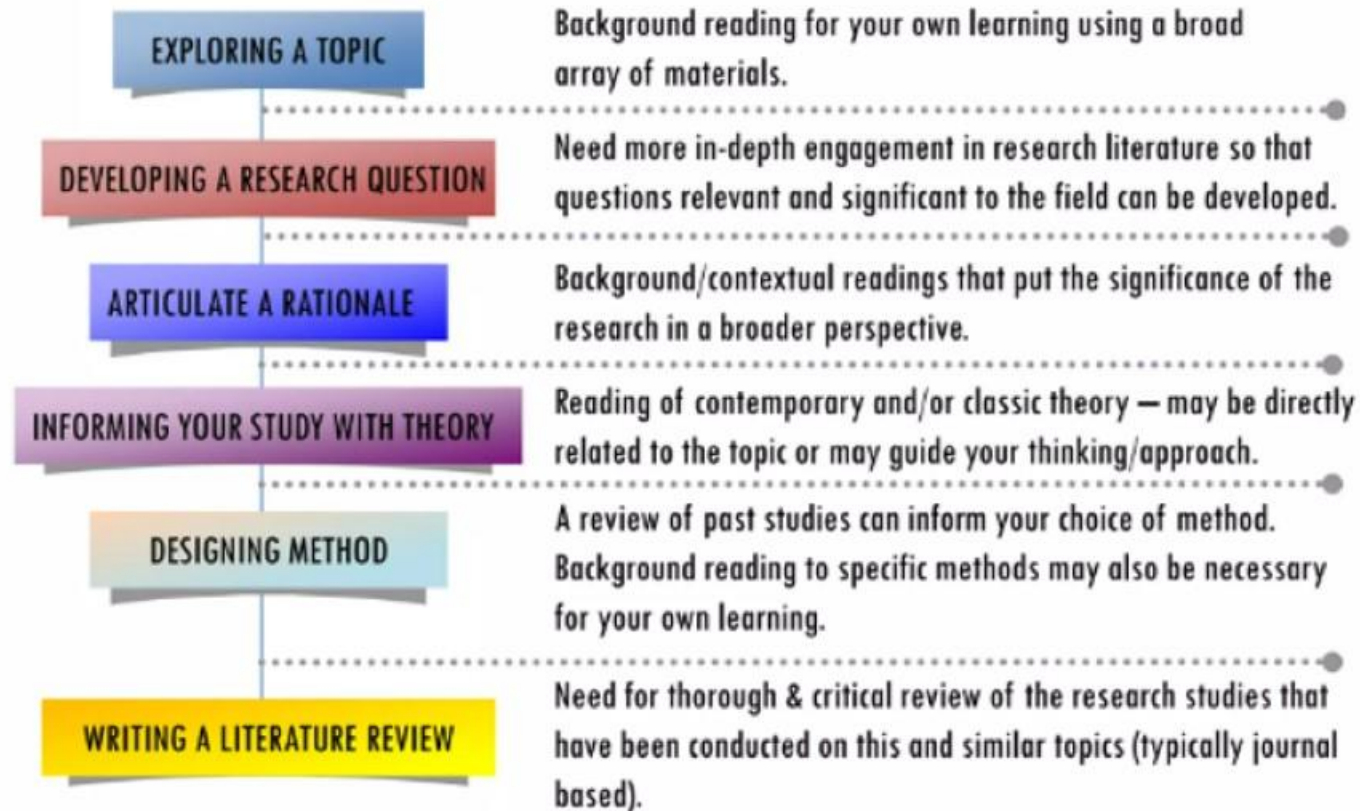
- What is the research question or objective?
- What is the scope of the research?
- What is the relevant literature on the topic?
- What research methods will be employed?
- Are there any ethical considerations to address?







Literature and Research Process





Reviewing the Literature vs literature Review

Reasons for reviewing the literature

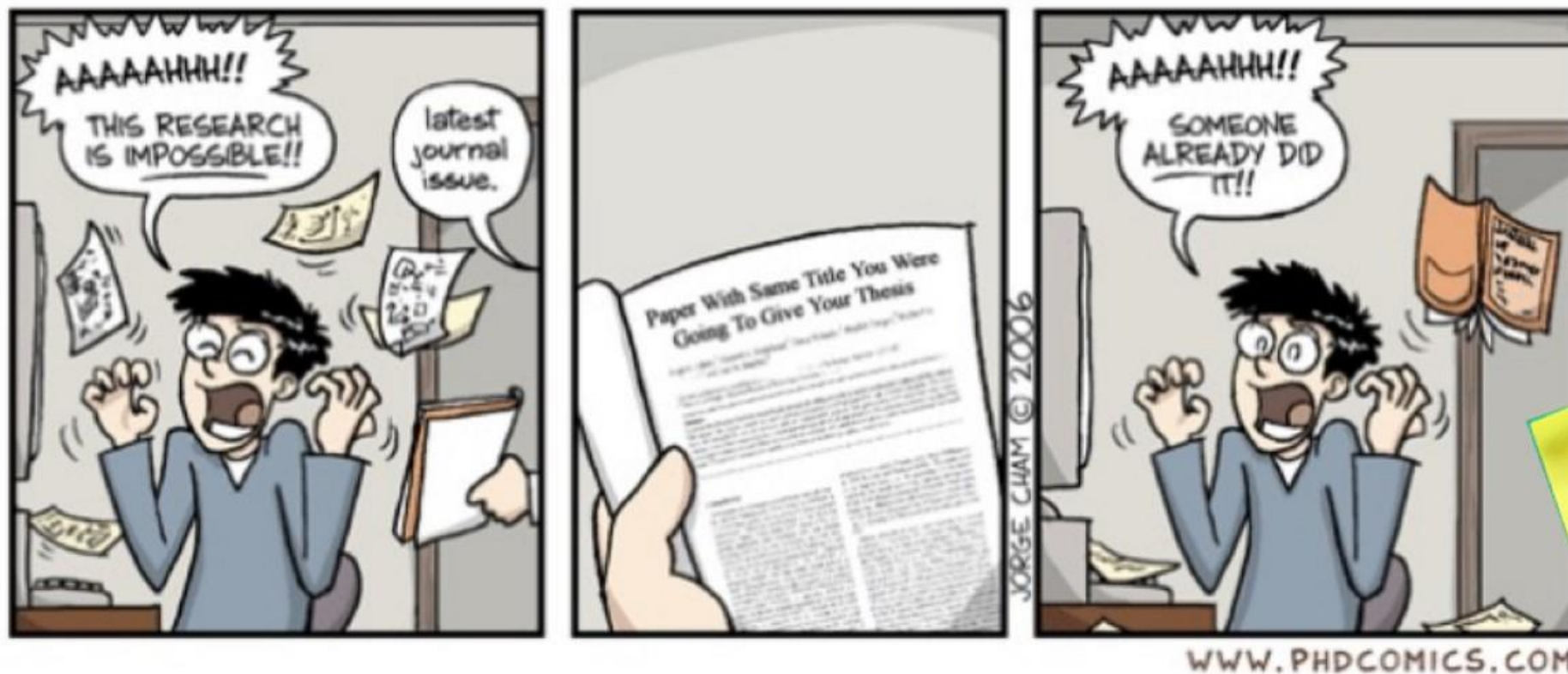
- Informing yourself of what is happening in the field
- Gaining a level of topical and methodological knowledge and expertise
- Finding potential gaps in the literature that may point to potential research questions
- Critically evaluating common/ typical methods
- Facilitating the development of your own methodological approaches

Purposes of the 'literature review'

- ✓ Informing your audience of what is happening in the field
- ✓ Establishing your credibility as a knowledgeable and capable researcher
- ✓ Arguing the relevance and the significance of your research question(s)
- ✓ Providing the context for your own methodological approach
- ✓ Arguing the relevance and appropriateness of your approach



Implication of incomplete literature review



Don't try
to reinvent
the wheel...



Implication of incomplete literature review (cont.)

Don't do "more of the same"...





What is literature Review?



Literature review is. a *critical analysis and synthesis* of existing research and scholarly articles on a particular topic or research question. (Clare & Hamilton, 2003, p. 8)



Literature review is a protracted task that provides an *assessment* of a *body* of research that address a research *questions*. (Bell, 1999, p. 93)



What is literature Review? (cont.)

- ❖ A *literature review* in *computer science* is a *comprehensive survey and critical analysis* of existing research, publications, and scholarly works relevant to a specific area or topic within the field of computer science.
- ❖ A *literature review* in computer science involves *synthesizing information* from various sources to provide a coherent and structured *narrative*. This *synthesis* helps to *establish connections* between different studies and *form a unified understanding* of the topic.



What is literature Review? (cont.)

- ❖ In academic and research contexts, synthesizing information often involves reviewing multiple sources, such as research papers, articles, or data, and then summarizing, comparing, and drawing conclusions from them.
- ❖ It goes beyond simply summarizing individual sources and aims to create a new understanding or perspective that emerges from the synthesis of these sources.
- ❖ Effective information synthesis requires critical thinking, analytical skills, and the ability to identify key insights or trends from a range of sources.



What is literature Review? (cont.)

- ❖ A *literature review* is reading other *people's writings* before we start our *own research*. Understanding the present requires knowledge of the past.
- ❖ A *literature review* can open the door to a more *effective investigation*.
- ❖ A *literature review* avoids *repetitions*.



What is literature Review? (cont.)

READ PUBLISHED WORK

Examine a variety of print- and web-based materials.

INTERPRETATION

Discuss the significance and interpret the evidence they have provided in each piece of literature instead of just listing the works of others.

SYNTHESIS

Creating "integrated whole" : a convincing justification for the research you are doing

Literature review



Researching a Topic

Start with your area of interest but stay away from subjects that are:

- ☐ too general
- ☐ too specific
- ☐ overused
- ☐ outdated
- ☐ do not warrant further investigation

It is impossible to read all research that has ever been published in your field.

To avoid drowning in information, it's important to read only what interests you.



Key Points of literature Review

Theory

Tell me what the research say...

Methodology

Tell me how the research was carried out...

Research Gap

Tell me what is missing or the gap that research intends to fill....



Why literature Review?

- ❖ To *demonstrate* understanding of the subject matter –*identifying*, *summarizing* and critically *assessing* past research that is relevant to your work.
- ❖ To *gain* a comprehensive understanding of the existing knowledge and research on a particular topic.
- ❖ To *identify* gaps in the current literature, highlight areas that need further investigation, and *provide* a foundation for new research.
- ❖ To *build* upon previous studies and theories, ensuring that their own work contributes to the broader academic conversation.



Reasons for Reviewing the Literature

- ❖ Shows how your study fills the “gap”: provide a basis for making critical decisions regarding the direction of research.
- ❖ The necessity and rationale of your study: setting a theoretical framework – Literature review is the foundations for your study, since the rest of your work will build upon the ideas and existing research you discuss.
- ❖ Set boundaries of your study: Developing a methodology by determining the scope and specific objective of existing research, you can make sure you adopt the most appropriate methods for your own work.





Importance of literature Review

The literature review plays a crucial role in academic research and has several key importance:

- ❑ *Establishing Context:* Provides the context and background for the research study, helping readers understand the broader field in which the research is situated.
- ❑ *Defining the Scope of Research:* Helps to narrow down and define the specific focus of the research project by identifying key concepts, theories, and areas of interest.
- ❑ *Identifying Gaps in Knowledge:* Reveals areas where the existing research is lacking or where further investigation is needed, thereby justifying the need for the current study.
- ❑ *Evaluating Previous Research:* Allows for a critical assessment of the quality, methodology, and findings of previous studies, providing a basis for the researcher to build upon or challenge existing knowledge.
- ❑ *Synthesizing Information:* Involves summarizing and synthesizing a wide range of sources to create a cohesive and comprehensive overview of the current state of knowledge on a particular topic.



Importance of literature Review (Cont.)

- ☐ *Understanding Theoretical Frameworks:* Highlights the theoretical models, frameworks, and concepts that have been used in previous research, providing a foundation for the current study.
- ☐ *Supporting Methodological Choices:* Informs the selection of research methodologies by showcasing approaches that have been successful in similar studies.
- ☐ *Providing Empirical Evidence:* If applicable, it presents the empirical evidence provided by studies, including experimental designs, data sources, and statistical analyses employed.
- ☐ *Identifying Conflicting Evidence:* Helps to identify areas of disagreement or conflicting findings within the existing literature, prompting further investigation or analysis.
- ☐ *Demonstrating Scholarly Familiarity:* Demonstrates that the researcher is familiar with and has thoroughly reviewed the relevant literature in the field, establishing their credibility as a scholar.
- ☐ *Guiding Hypothesis Formulation:* Aids in the formulation of hypotheses or research questions by providing a foundation of knowledge upon which the research can build.



Types of literature Review

Identifies, evaluates, and appraises the studied topic.



**Systematic
Literature Review**

implies gathering theories which are apply to studied ideas or concepts.



**Theoretical
Literature Review**

starts with a problem statement. Then, you select and study the topic-related literature to confirm or deny the stated question.



**Argumentative
Literature Review**

Indicates possible gaps and concludes the body of literature.



**Narrative
Literature Review**



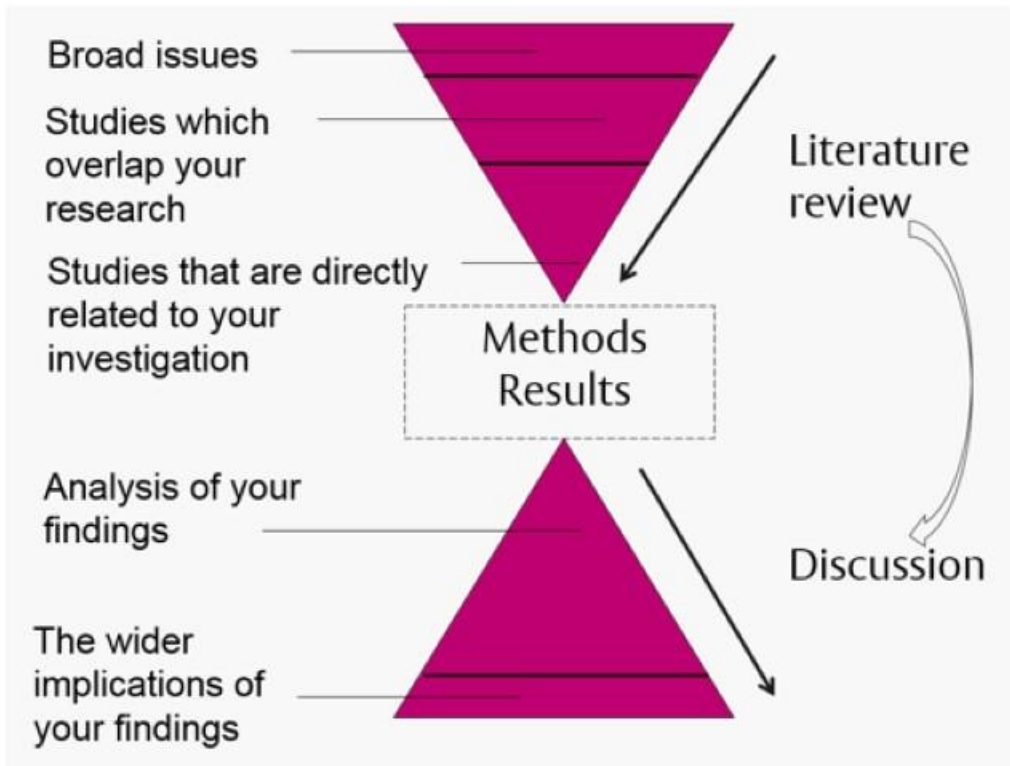
**Integrative
Literature Review**

generates new statements around the existing research.



Organization of literature review

A general organization of literature review looks like a





Content of a Literature Review

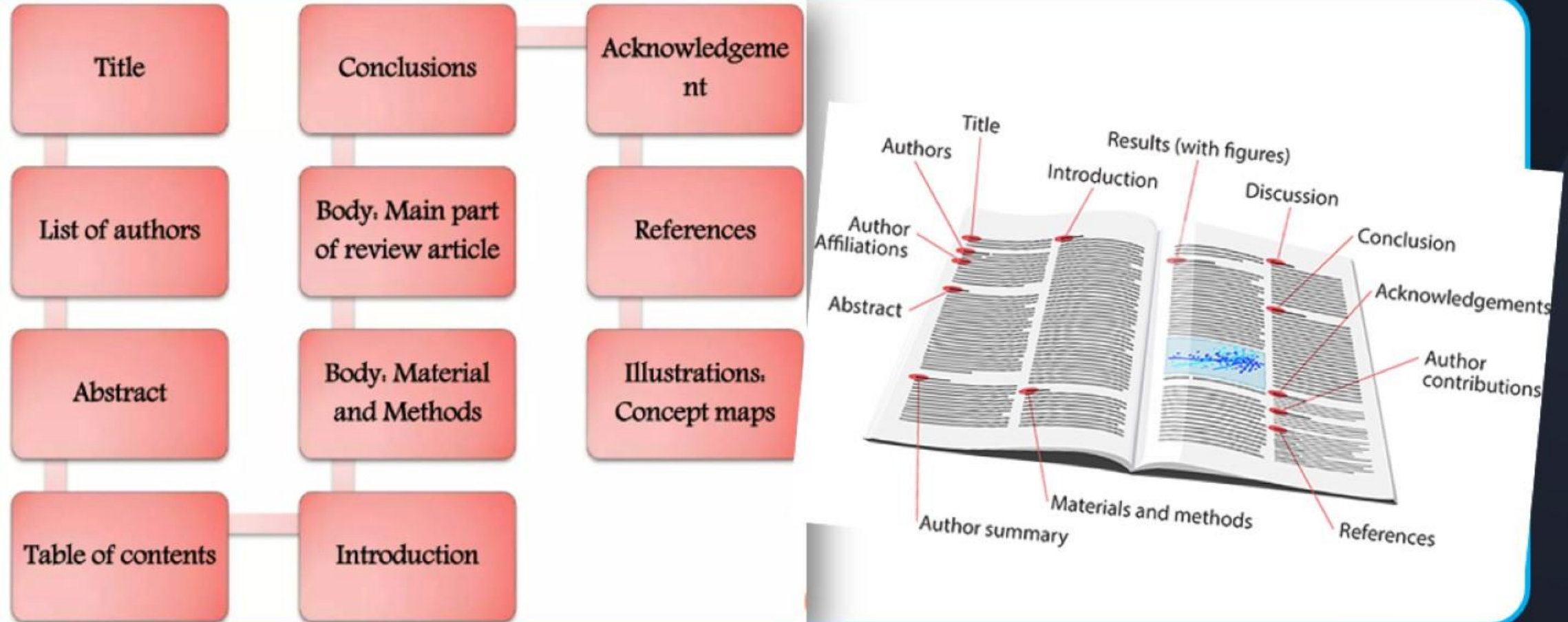
Relevant literature can be found in a variety of formats, including *books*, *book chapters*, *journal articles* that have been published, *papers or presentations* that have been given at conferences, *theses*, or *doctoral dissertations*.

When choosing sources consider:

- Is it scholarly work?
- Does it relate to the topic?
- Is it theoretically grounded?



Component of Review Articles





Organizing/Outlining

Methods for organizing the Review of literature

- By subject (if lit review covers more than one subject)
- By theme, idea, trend, theory, or major research studies
- By author
- Chronological
 - By publication date
 - By trend

Methodological

- Focuses on the methods of the researcher, e.g., qualitative versus quantitative approaches



Evaluating the Literature

You must look through all the available information about interest and ask:

- ☐ Are there gaps in existing research?
- ☐ What are the benefits of previous studies, and how will a new study add to the existing body of knowledge?
- ☐ What are the restrictions of the study that is being considered?



Guidelines for Creating a Literature Review

- ☐ Create an outline and process goals to guide work for the project.
- ☐ Process goals are objectives needed to accomplish a task.
- ☐ Break the assignment into manageable pieces.
- ☐ Work on one task at a time.
- ☐ The use of section headers creates clear and logical flow.
- ☐ Organize the existing research by points of relevance and elaborate on conclusions in the existing body of research.
- ☐ Organize by theoretical foundation and draw relationships between the current project and previous studies.
- ☐ Rules of Thumb:
 1. There should be a source for every citation and a citation for every source.
 2. If a source is in your reference list, it should be used somewhere in the body of your paper.

(VanderMey et al., 2011; Sheperis et al., 2017)



Planning for Literature Search

-  **Define the topic** General reading; prepare a list of terms.
-  **Think about the scope** What is the time frame of search (how far back?)
-  **Think about the outcomes** What it is you want to get out of the search?
-  **Think about the management** How are you going to manage the search results?
-  **Plan sources to be searched** The list and sequence of sources to be searched

(VanderMey et al., 2011; Sheperis et al., 2017)



Steps for Writing literature Review .

*Where do I look for resources for my literature review?
What Type of Literature Review Am I Writing?*

Finding Sources for a Literature Review



1. Define keywords
2. Find scholarly databases
3. Use keywords to search
4. Check each source
5. List all the relevant sources



Steps for Writing literature Review (cont.).

Steps to follow when conducting a literature review:

- ☐ **Identify the key terms:**
 - ☐ identify what you already know and what you need to find out.
 - ☐ List keywords and Synonyms related to your topic.
- ☐ **Locate literature:**
 - ☐ Identify relevant sources
 - ☐ Search for literature.
- ☐ **Evaluate and select literature:**
 - ☐ Read and Record: Read strategically, read critically, and record important points.
 - ☐ Evaluate the quality of the literature
- ☐ **Organize literature** : Organize and synthesize the literature: Introduction, body and conclusion
- ☐ **Write literature Review.**





Elements of Writing The Literature Review

Introduction

- An introduction should provide your reader with answers to the following questions:
 - What is your topic?
 - Why is it important to investigate this topic?
 - What are the key themes that you are going to discuss?

Gives a quick idea of the topic of the literature review, such as the central theme or organizational pattern.

Body

- The body of a literature review breaks down your topic into themes. A paragraph should include:
 - A main statement / idea, e.g. topic sentence related to a theme
 - A discussion that compares and contrasts the literature and identifies any gaps
 - analysis and evaluation of the research literature/themes where appropriate
 - summing up and linking to the next idea in the next paragraph.

Conclusion

- As with any essay, the job of the conclusion is to:
 - Summarise the key findings within the literature
 - Summarise the main points you have made
 - Restate your argument/draw your final conclusions

Discuss what you have drawn from reviewing literature so far. Where might the discussion proceed?



Making links between studies

Agreements

- Similarly, author B points to...
- Likewise, author C makes the case that...
- Author D also makes this point...
- Again, it is possible to see how author E agrees with author D...

Disagreements

- However, author B points to...
- On the other hand, author C makes the case that...
- Conversely, Author D argues...
- Nevertheless, what author E suggests...



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Thank You