Research Methodology

Chapter 2
Literature Review

Acknowledgement
Most of the materials presented in the lecture note is taken from the note prepared by Abdul Karim Alias, Universiti Sains Malaysia, with minor amendments.

Before starting your research, ask the following 3 questions:

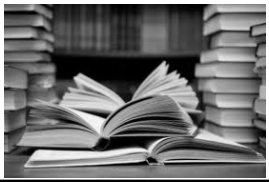
The question that I wish to answer are worthy for research?

Do I know my stuff sufficiently?

The methodology I choose is 'doable' way of getting the answers to the question?

1.1 What is literature?

- '....a collection of all the scholarly writings on a topic.' FINK, A., 1998. *Conducting literature research reviews: from paper to the internet.* Thousand Oaks, CA: Sage., p.3.
- Literature is about telling a story .... kind of a chain story where each writer starts with a partial story created previous by others and expand on it.



What is Literature Review?

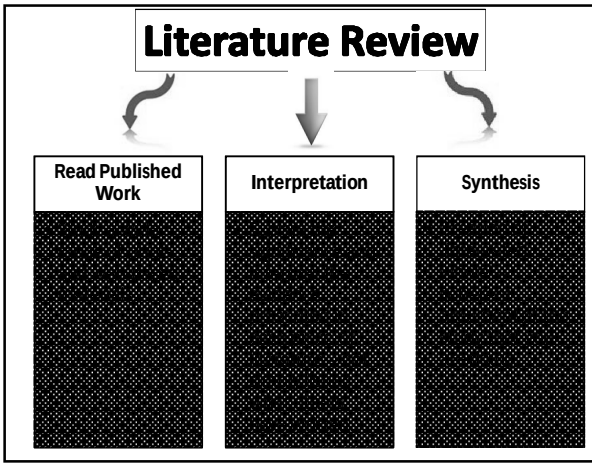
- '...a systematic... method for identifying, evaluating and interpreting the...work produced by researchers, scholars and practitioners.'

FINK, A., 1998. *Conducting literature research reviews: from paper to the internet.* Thousand Oaks, CA: Sage., p.3.

- 'An interpretation and synthesis of published work.'

- Merriam (1988:6)

***Your own idea will connect to the developing knowledge network in the field.*



1.2 The important of Literature Review

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

-Woodraw Wilson-

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

Purposes of reviewing the literature:

1. **Gain a background knowledge of the research topic: Provide an overview and critical appraisal of pass & current thinking, ideas, policies and practices.**

2. **Show how your study fills the "gap": Provide a basis which to make critical decisions regarding the directions of a research.**

3. **The necessity and rationale of your study : Does it make sense? Why it is important? How it is different? How it is novel? Is it justifiable?**

4. **Set boundaries of your study : Determine the scope & specific objectives.**

5. **Identify the concept relating to it: potential relationships between them and to formulate researchable hypothesis.**

6. **Identify appropriate methodology, research design and technique of analysis.**

7. **To learn how others structured their reports.**

Beyond the scope of my research

What is the Purpose of a Review?

Gall Borg and Gall (1996)	Hart (1998)
Delimiting research problem	Distinguishing what has been done from what needs to be done
Seeking new lines of inquiry	Discovering important variables relevant to the topic
Avoiding fruitless approaches	Synthesizing and gaining new perspective
Gaining methodological insights	Identifying relationships between ideas and practices
Identifying recommendations for further research	Establishing the context of the topic or problem
Seeking support for grounded theory	Rationalizing the significant of the problem
	Enhancing and acquiring the subject vocabulary
	Understanding the structure of the subject
	Relating ideas and theory to applications
	Identifying the main methodologies and research techniques that have been used
	Placing the research in historical context to show familiarity with the state-of-the-art developments

Source: J.J Randolph (2009)

- **Increase understanding of theoretical background.**
- **It will give u idea.**
- **It may cause u to change your mind.**
- **Develop/improve skill to source material.**
- **Develop skill to summarize & synthesize information.**

FINALLY : ***Generate your own idea!***

1.3 Identifying Keywords

An Energy-Efficient Hybrid Data-Gathering Protocol Based on the Dynamic Switching of Reporting Schemes in Wireless Sensor Networks

- *Adaptive algorithm , embedded software , wireless application protocol , wireless sensor networks*

Novel Tensor Product Models for Automatic Transmission System Control

- *Automatic transmission , control systems , drive line , tensor product (TP) models , valve–clutch*

Carbon Nanotubes With Different Orientations for Electrochemical Biodevices

- *Chemical vapor deposition , cyclic voltammetry , electrochemical biosensors , etoposide , hydrogen peroxide , multiwalled carbon nanotubes , potassium ferricyanide , wettability*

Noise Effects on Excitable Chaotic Attractors in Coupled Light-Emitting Diodes

- *Chaotic spiking , coupled systems , excitability of attractors , light-emitting diodes , noise , stochastic coherence , stochastic incoherence*

Detuning and Thermal Effects on the Dynamics of Passively Mode-Locked Quantum-Well Lasers

- *Mode-locked lasers , saturable absorber (SA) , semiconductor lasers , thermal effects , traveling-wave model (TWM)*

Super-Homogeneous Saturation of Microwave-Photonic Gain in Optoelectronic Oscillator Systems

- *Mach–Zehnder modulator , Microwave photonics , gain saturation , optoelectronic oscillators*

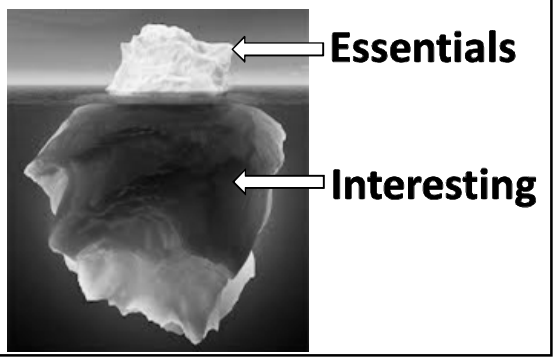
1.4 Strategy to Elaborate Literature Review

It is impossible to read all the research ever published in your area....

Be selective in what you read.

--or else you'll get drown in too much information.--

Filtering and sorting the essentials from the irrelevant.



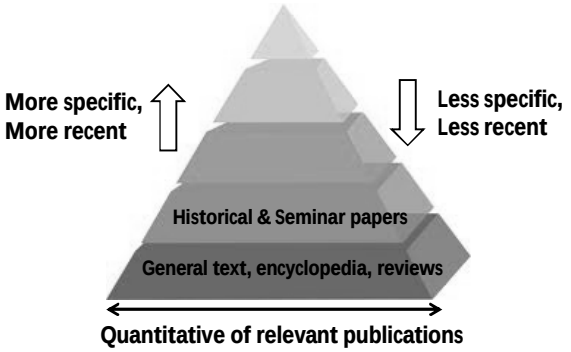
<u>The range of literature to explore:</u>

Background material which is of broadly relevance to your study.

Literature and research studies which address issues that are closely related to your study.

Literature which is directly related to your study.

Searching and reading strategy:



Literature Sources

Sources & Organizations Providing Publications	Tools for Searching Published Works & Data
• Academic library • Public library • National library • Special collection • Commercial databases (Scopus, Springerlink, Sciencedirect, etc.)	• Library catalog • Bibliographies • Encyclopedia • Internet search engine

Sources Where Research & Information is Published

- Textbooks
- Articles
- Theses
- Legal & Professional publications
- Conference papers

Managing The Literature by Organizing Information

- Summarize
- Tabulate
- Use bibliography software (Endnote)

Components of Literature Review

Scope

- How far back? (Master's ~10 years; PhD's – further back)

Background Information

- Introduce topic
- Review past and present literature
- Describe scope and organizations
- Clarify purpose

Components of Literature Review

Theory

- All research has a precedent/example.
- Be aware of relationship to your topic.

Critical appraisal/synthesis

- Not just a list of the work of others.
- Identify issues highlighted.
- Highlight differences & similarities.
- Identify consensus.

How to Evaluate a Literature Review?

Category	Criterion	1	2	3
1. Coverage	A. Justified criteria for inclusion and exclusion from review	Did not discuss the criteria for inclusion or exclusion	Discussed the literature included and excluded	Justified inclusion and exclusion of literature
2. Synthesis	B. Distinguished between what has been done in the field and what needs to be done	Did not distinguish what has and has not been done before	Discussed what has and has not been done	Critically examined the state of the field
	C. Placed the topic or problem in the broader scholarly literature	Topic not placed in broader scholarly literature	Some discussion of broader scholarly literature	Topic clearly situated in broader scholarly literature
	D. Placed the research in the historical context of the field	History of topic not discussed	Some mention of history of topic	Critically examined history of topic
	E. Acquired and enhanced the subject vocabulary	Key vocabulary not discussed	Key vocabulary defined	Discussed and resolved ambiguities in definitions
	F. Articulated important variables and phenomena re asset.png the topic	Key variables and phenomena not discussed	Reviewed relationships among key variables and phenomena	Noted ambiguities in literature and proposed new relationships
	G. Synthesized and gained a new perspective on the literature	Accepted literature at face value	Some critique of literature	Offered new perspective

Source: J.J Randolph (2009)

3. Methodology	H. Identified the main methodologies and research techniques that have been used in the field, and their advantages and disadvantages	Research methods not discussed	Some discussion of research methods used to produce claims	Critiqued research methods
	I. Related ideas and theories in the field to research methodologies.	Research methods not discussed	Some discussion of appropriateness of research methods to warrant claims	Critiqued appropriateness of research methods to warrant claims
4. Significance	J. Rationalized the practical significance of the research problem	Practical significance of research not discussed	Practical significance discussed	Critiqued appropriateness of research methods to warrant claims
	K. Rationalized the scholarly significance of the problem	Scholarly significance of research not discussed	Scholarly significance discussed	Critiqued scholarly significance of research
5. Rhetoric	L. Was written with a coherent, clear structure that supported the review	Poorly conceptualized, haphazard	Some coherent structure	Well developed, coherent

From "Scholars before Researchers: On the Centrality of the Dissertation Literature Review in Research Preparation," by D. N. Boote and P. Beile, 2005, *Educational R* asset.png (6), p. 8. Copyright 2005 by Sage Publications. Reprinted with permission of Sage Publications

Source: J.J Randolph (2009)

1.5 How to Read Research Papers

- Research papers are written in a very condensed style because of page limitations and the intended audience, which is assumed to already know the area well.
- Your time is very limited. You may not have time to read every word of the paper or read it several times to extract all the nuances.

"Reading a research paper can require a special approach"

Tips on reading research papers:

Read the title. (What is the paper about?)

Read the abstract. (Should give you a concise overview of the paper.)

Read the introduction. (Look for motivations, relation to other work, and a more detailed overview.)

Look at the structure of the paper.

- What do the remaining sections address?
- How do they fit together?
- Read the previous/related work section.

  (How does this work relate? What is new or different about this work?

Read the conclusions. (What were their results?)

Read the body of the paper. (skip over all the equations the first time through)

Create a list of questions.

- about parts that you don't understand.
- about parts where you question their solution/proof/methods/results.

The references may be contained important parts of the work.

- The references are very important — they point you to related research as well as the research upon which the current paper builds upon.
- For further reading, see the references!

Questions to ask while reading a research paper:

What problem(s) are they solving?

Why are these problems important?

What is the proposed *solution*?

(This is also called the **hypothesis** or **idea**.) (There should also be an answer to the question *why is it believed that this solution will work, and be better than previous solutions?)*

What did they really do? (as opposed to what the authors say or imply they did)

What is the contribution of the work? (i.e. what is interesting or new?)

What methods are they using?

Underlying theory or assumption?

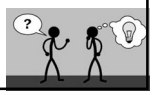
What were the results? Did they do what they set out to do?

Do you agree with the conclusions?

What are *future directions* for this research?

(Not only what future directions do the authors identify, but what ideas did you come up with while reading the paper?

Would you have solved the problem differently?



1.6 Expected Deliverable Output

- Expected outputs of a research project are the deliverables from the research work.
- What will you produce as a consequence of this research?
- From a PhD or Masters perspective, the deliverables could be as simple as producing quarterly or monthly reports with a written thesis at the end of your studies.

- All funding bodies will expect you to clearly state your forecasted outputs and they will expect them to be achieved at the end of the project within the time limit stated by your proposal.
- Outputs are stated as **milestones** within your research plan, but it is always a good idea to document them as bullet points, providing deadline dates for achieving them.

It's called **reading**.
It's how people install new software into their brains.