Purpose of an Effective literature survey

- You will have a solid understanding of your research.
- You will be able to connect your ideas with different authors.
- To show that there was a gap in research and you can justify the gap.
- To know what are the models available, calibration methods, sampling volumes and sampling methods adopted.
- To ensure your work is not going to be duplicated to avoid plagiarism.
- To confirm when was your chosen research topic started (Recent or very old).
- To confirm Non-Obviousness, if the topic is too old – high Obviousness, Very recent – Non-obviousness is more.
- To understand existing globally recognized experimental methodology.
- To understand the merits and demerits of using various instruments to know which instruments, operating temperature, flow, carrier gas, detector is suitable for your chosen parameters.
What is ReSEARCH?

- ReCOGNISE. ReVIEW, ReSEARCH

- A non-obvious, A non duplicated but replicable or reproducible
- Original, Well Evidenced, Well documented

THE ADDITION OF
NEW NOVEL KNOWLEDGE TO THE EXISTING KNOWLEDGE DOMAIN AND THIS NEW KNOWLEDGE should be able to be reSEARCHED by some one else to conceptualise, hypothesize and to prove another new knowledge that should be (re) searched by your grand students.

so search, search, search and finally reSEARCH FOR TRUE INVENTIONS NOT ONLY FOR PUBLICATIONS AND PROMOTIONS, AND PROJECTIONS BUT TO SOLVE THE SOCIETAL AND INDUSTRIAL CEISIS.

MONEY / INDUSTRIAL /SOCIETAL VALUE OF YOUR PhD THESIS
So you are appreciated when you became a NEED BASED, VALUE ADDED RESEARCHERS or a TEACHER
LEARNING PROCESS

- Accumulation of Thought
- Accumulation of Imagination
- Accumulation of Understanding
- Accumulation of Learning

through effective reading and studying

DIFFERENCE BETWEEN

READING – just to entertain yourself temporarily
STUDYING- only to score marks
LEARNING- not forgetting, like driving, swimming
Can you please choose the one that you would like to do for your PhD

- I Wants to get my PhD
- I wish to get my PhD
- I make it to happen my PhD

- “PhD SHOULD BE TAKEN BY MERIT OF THE SCHOLAR NOT TO BE GIVEN BY MERCY OF THE SUPERVISOR”
National workshop on Planning and preparing a SMART PhD thesis of an international quality

What is meant by a **SMART PhD**

- **S** = SPECIFIC
- **M** = MATERIALISTIC
- **A** =ACHEIVABLE
- **R** = RESEARCHABLE
- **T** = TIME TARGETTED

PhD
PLANNING YOUR PhD DURATION

- 0-6 Months , complete literature survey
- 6-12\textsuperscript{th} Month , Confirm Research gap
- 12\textsuperscript{th} to 16\textsuperscript{th} Month — Confirm your Experimental /Graphical Methodology
- 16\textsuperscript{th} to 36\textsuperscript{th} Month Complete all your experiment with publishing minimum 3 research papers
- 36-42 Month (within 3.5 years) thesis writing and submission

- Keep updating your literature review every year and get familiar with recent updated literatures on your topic.
1) Choose a broad topic, narrow down and confirm your topic as early as possible 2 months before comprehensive viva.

2) Confirm the list of prominent journals for your research topic.

3) Collect literatures (minimum 50 papers) without missing any relevant papers but without any irrelevant papers.

4) Chapter-wise Filtration / grouping / develop files for each chapters.

5) Paraphrase the conclusions from literatures chapter-wise.

6) Critical review of literatures, together with summary table.

7) Find, evaluate and confirm the gap in research as YOUR original, non-plagiristic, non-obvious.

8) Conceptualise your research gap.

9) Hypothesize your Research Concept.

10) Experiment YOUR OWN research hypothesis.

11) Prove the Hypothesis with your own data interpretation.

12) Address and hold this as your own proven research hypothesis.

13) Add your new hypothesis with the existing knowledge domain in your area, Let your PhD students re-SEARCH.

14) Title your name on your proven hypothesis.
DIFFERENCE BETWEEN LITERATURE REVIEW AND REVIEW OF LITERATURES AND CRITICAL REVIEW OF LITERATURES

- **Literature review is actually general** *(Title specific)*
  - It is a broad and generic review in a topic
  - More research papers can be included and discussed

- **Review of Literature** *(chapter specific)*
  - With reference to particular focused topic and year, too narrow discussions of a specific topic, needs to be too critical and show evidence of similarities and dissimilarities of a topic

- **Critical Review of Literature is** *(data specific)*
  - Data to be criticized in a summary table.
  - Helps to identify research gap.
  - Helps to understand and the attributed reasons for high or low values of a data
DIFFERENTIATE RESEARCH OVERVIEW PAPER WRITING AND REVIEW PAPER WRITING

- Literature writing
- Review of literature writing
- Critical review of literature writing
- Summary of literature review writing

- “Overview paper writing” and “review paper writing”.

When Should you write research overview paper and critical review paper?

- “Research overview paper” preferably before completing first year comprehensive viva

- Critical “Research review paper” after publishing minimum three research paper on the same topic and you became an expert to criticise other’s conclusions then only one should write review paper
STEPS IN LITERATURE REVIEW

1) Search the literature relevant to your study

2) Evaluate & Select Sources of information's

3) Identify themes, concepts, models, chapters

4) Organizing and outlining the literatures

5) Start Writing the Literature review, Review of literatures and critical review of literatures
1) **Search the literature relevant to your study**

- Develop List of Key words
- List of Synonyms
- Open a Scholarly data base
- Google scholar
- Pub-Med Science direct, End Note
- Identify most important publications
2) Evaluate and Select sources of information

- Do not read full articles initially.
- Read the abstract and develop ideas on conclusion statements
- Look at the bibliography of each publication
- Observe the number of high citation papers and authors.
- Select good researchers in your field internationally in the reputed institutions
- Be in touch with high citation authors with your topic of discussion from the beginning of your research helpful to identify the Post Doctoral mentors
3) Identify your themes, debates and gaps

- Takes notes of the connections of different sources to easily organise your review

- Observe for the
  - Trends and patterns of the data published,
  - Debates and contradictions,
  - Influential studies
  - Gaps
4) Organising by outlining the literatures

- a) Chronological order

- b) Thematic organising with several key themes

- C) Methodological Organising with different research methods being used across studies

- d) Theoretical use to discuss opposing theories and models
Collecting, managing and summarising a critical review of literature

<table>
<thead>
<tr>
<th>Jungle (50 literatures)</th>
<th>Filtration /Classification Of literatures</th>
<th>Finding Similarities and Dissimilarities</th>
<th>Finding novel ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am re-searching for??</td>
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</tbody>
</table>
Choose a broad topic, narrow down and confirm your topic as early as possible 2 months before comprehensive viva

- Choose the PhDiable research topic.

- Confirm the Instrumentation facilities for your research topic within your research group/university/IIT SAIF/ IISc, Bangalore and outsourcing of analysis.

- You need to confirm your broad research topic within 6<sup>th</sup> month

- Plan to narrow down your topic every month till your 10<sup>th</sup> month and further narrow down till you submit your thesis.

- 11<sup>th</sup> and 12<sup>th</sup> month Confirm your topic because you need to present it to your Comprehensive viva.

- Literatures are the prime source of information for the correct methodology, correct topic, comparing your results with other’s technique, methods of calibration and validation of your data.
Confirm the list of prominent journals for your research topic
(Sources of literatures)

- Ask list of journals from your PhD supervisor first.
- Senior research students in your group
- Science direct.com, subscribe free direct content e-mailing services
- Google your topic. Elsevier Science, Pergamon press,
- Inter-Valley science Ltd., John Wiley & Sons
- Repeated publication of your research topic frequently
- Frequency of journals referred in the references
- See the back reference, number of papers reported in a journal of your research
- Former Ph.D thesis (Available in Library)
- Conference Proceedings (International conferences mostly)
  - Confirm the list of old journals back volumes available from Anna University, IITs and Science direct.com
  - Confirm from which year the journals back volumes are available in IIT and
EI Village, ZOTERO, MANDELLEY/ENDNOTE/BIBLIOGRAPHY

- Free Contents alerts subscription
- Student - Free subscription of journals and membership for your field of research.
- Student membership in International research association pertaining to your research.
- Developing an End-note library
- End-note - Remote access - awareness
3) Collect literatures (minimum 50 papers) without missing any relevant papers but without any irrelevant papers

- Fist and far most- find out from Anna University, IITm, SERC, Madras University Library, as what are the journals each institute has subscribed online as well as offline.

- Look at the hard copies of Journals back volumes from which year it is available

- Type your key word of your research topic in Science – Direct.com

- You will get all published papers’ abstract.

- Collect first abstracts of published papers from Science-direct.com, Engineering village Directly journals web site.

- Store abstracts and Store full text papers in PDF atleast 50 papers.

- Every papers back referencing should be verified to get more literatures.
Paraphrasing and Summarising the research with literatures collected

1. Filter all your collected literatures into many chapters relating to your research

2. Find interesting chapters and methods that help you to carry out your research

3. Paraphrase each chapters with the conclusions of each authors reported

4. Discuss each chapter’s conclusion of many authors and find the best innovative contributions done in your research area

5. Prepare a summary table of only results (numbers) of the authors in an ascending years, will help you to compare your results later and to find the gap
5) Start Writing the literature review and review of Literatures

**General Literature review WRITING**

**Introduction**

Similar and dissimilar statements from each broad topic

**Review of Literatures writing**

Chapter-wise conclusions relevant to the each chapters
Similar and dissimilar statements from each chapters
Possible methods to be adopted and non-adoptable methods
Critics on Sampling methods procedures
Find out broad gap in research

**Critical Review of Literatures writing**

Prepare the review of literature summary in a tabulated form of data published and their merits and demerits of data.
Analyze the Gap in research
Establish the gap as your concept
General Literature review writing

- Do not copy and paste the information from the published literatures.

- Write yourself, review and edit your writing, sequence it appropriately. Learn the art of writing slowly by yourself.

- The information written should be able to convey the message on your own style of English

- Try to improve the English and the write ups with repeated editing with checklist from your supervisor

- Understand from your former PhD thesis and research papers
Review of Literature writting

- Analyse each chapter-wise independently.

- Within each parameters reason out why some one got maximum yield and few got lower yield.

- List out the reasons for maximum and minimum values and describe science besides lower and higher values.

- Develop your own understanding on that values reported, as why it is

- Develop an alternative methods of analysis to maximise the yield beyond what has been already reported, for example using a catalyst, or improving the reaction mechanisms
Critical Review of Literature writing

- Interlink each chapters and discuss the influence of one chapters with other chapters.

- Formulate the criticism based on the impact on one chapter’s data on the other chapter.

- Understand and report what are the data of significant parameters influence the yield and how to optimize many parameters together.

- Synchronise the criticism of minimum and maximum values with a scientific hypothesis and attributed reasons of its mimnima and maxima with many chapters influence on one particular parameter.
Many previous researchers have emphasized the importance of adequate mixing to improve the distribution of substrates, enzymes and microorganisms throughout the digester (Parkin and Owen, 1986; Chapman, 1989; Lema et al., 1991). For instance, et al. (1992) described that, This was supported by et al. (1992), et al. (1993) et al. (1995). However, those informations on the effect of the intensity and duration of mixing on the performance of anaerobic digesters are contradictory. Several studies indicated that a lack of sufficient mixing in low solids digesters dealing with municipal waste resulted in a floating layer of solids (Diaz and Trezek, 1977; James et al., 1980; Stenstrom et al., 1983). Chen et al. (1990) concluded higher methane yield in the case of a 4.5 m3 digester under unmixed conditions than continuously mixed conditions. Similar results were also reported by et al. (2002); et al. (2006). However, Ben-Hasson et al. (1985) observed 75% lower methane production rate using the dairy cattle manure under continuously mixed conditions than the unmixed conditions. Contrary to this, Ho and Tan (1985) revealed that the higher gas production for a continuously mixed digester than for an unmixed digester fed with palm oil mill effluents, whereas Hashimoto (1983) found higher biogas production from beef cattle wastes under continuously mixed conditions than under intermittent mixing conditions. Similarly, Dague et al. (1970), Mills (1979) and Smith et al. (1979) suggested an intermittent mixing yields better efficiency of anaerobic digesters over continuous mixing.