Metodologi Penelitian

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Penelitian (Research)?

- Research is all about asking and answering a question or solving a problem……..
- Identify an issue, question, or problem.
- Find out what's already known about it.
  - Discuss with experts, read / conduct literature reviews on the topic.
- Plan, cost, and do your study accordingly.
- Write it up and submit it for assessment.
  - Better still, do a good job on it and submit it for publication.
    - Your work will benefit more people if you publish it.
    - Rule No. 1 in academia is publish or perish.
Dimensions of Research

topic: computing, physical, biological, etc.

novelty: create new, review published data, info

technology: develop new or use existing methods

scope: study a single case or a sample

mode: observe or intervene

methodology: qualitative or quantitative

ideology: objective or subjective

politics: neutral vs partisan

utility: pure vs applied

reassembling the dimensions
Finding a good question/problem to address can be hard. It helps to have a good colleagues, and/or knowledge or practical experience of and affinity for a topic. We must read journal articles to find out what's already known. Scientists also often point out topics for future research.
All research projects are so-called **original investigations**. Obtain new data or information about a topic. Some research projects are **reviews of the literature**. Use other researchers' published data or info about a phenomenon. **We should "earn our spurs" doing original research before taking on a stand-alone review.** But a write-up of an original investigation always has to include a short review of literature.
Gas–liquid countercurrent two-phase flow in a PWR hot leg: A comprehensive research review

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ABSTRACT
Research into gas–liquid countercurrent two-phase flow in a model of pressurized water reactor (PWR) hot leg has been carried out over the last several decades. An extensive experimental data base has been accumulated from these studies, leading to the development of phenomenological correlations and scaling parameters of the countercurrent flow limitation (CCFL). However, most of the proposed correlations apply under a relatively narrow range of conditions, generally limited to the test section conditions and/or geometry. Moreover the development of mechanistic models based on the underlying physical processes has been limited. In contrast to this mechanistic form of modelling, the implementation of computational fluid dynamics (CFD) techniques has also been pursued, but the considerable robust three-dimensional (3D) closure relations for this application remain an unachieved goal due to lack of detailed phenomenological knowledge and consequent application of empirical one-dimensional experimental correlations to the multidimensional problem.

This paper presents a comprehensive review of research work on countercurrent gas–liquid two-phase flow in a PWR hot leg and provides direction regarding future research on this topic. In the introductory section, the problems facing current research are described. In the following sections, recent experimental as well as theoretical research achievements are overviewed. In the last section, the problems that remain unsolved are discussed, along with some concluding remarks. It was found that only limited theoretical developments exist in the literature, however highly reliable experimental data are needed to support this effort. Additional work, both analytical and experimental, needs to be carried out on the effects of mass transfer on countercurrent flow limitation to improve the existing correlations and analytical models.
Technology: develop new or use existing method(s)?

• A legitimate topic for study is methodological.
• For example, development or novel investigation of…
  — a measuring device
  — a protocol for a physical performance test
  — a method of analysis.
• We should include or focus on a reliability and/or validity study of the measure provided by the method.
  — Validity = the relationship between observed and true values.
  — Reliability = reproducibility of observed values.
Pure or applied researches?

Pure : to understand the cause or mechanism of a phenomenon. 
Applied: impact directly on health, wealth, or culture or on development of a method. Even so, try to include mechanisms in an applied project. It will help you publish in a high-impact journal, because their editors and reviewers can be snooty about pure research.

Pure is sometimes lab-based, lacking naturalness. Applied is sometimes field-based, lacking control.
Additional remarks

• A given research project can be characterized by topic, novelty, technology, scope, mode, methods, ideology, politics and utility.

• This dimensional view may help you sort out a good approach to a specific project, but…
  — I may have missed or mangled some dimensions.
  — There may be better ways to understand research.

• Your work needs to be credible to some people and preferably also published if it’s to have any impact.
Basic steps of a research project

Find a topic ➔ What, When
Formulate questions ➔ What, Why
Select design & measurement ➔ How
Interpret evidence ➔ How & Why
Publish it !!!
Types of research methodologies

QuaLitative Measures

— Descriptive
— Numbers not the primary focus
— Interpretive, ethnographic, naturalistic

QuaNtitative Measures

— N for numbers
— Statistical
— Quantifiable
Common Pitfalls in Researches

• Problems with generalizability
  – False conclusions
  – Transformations
Getting Started

Finding a topic needn’t be traumatic

Work projects → Research studies

- Library GO Bond Proposal Project
- Library workshop trends
- User repair strategies
- Data collection involves agreement & consent
- Forge partnerships
- At some point you will need to leave the comfort zone of *reading and literature gathering* and…… (start it…..)
LITERATURE REVIEW
- A literature review can be just a simple summary of the sources, but it usually has an organizational pattern and combines both summary and synthesis.

- It might give a new interpretation of old material or combine new with old interpretations.

- The purpose of a review is to analyze critically a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles.

- The format of a review of literature may vary from discipline to discipline and from assignment to assignment.
Critically Analyzing the Literature

- **Abstract**
  - the author’s description of the study
  - related to your area of interest?
  - conclusions relevant?

- **Statement of the Problem**
  - restate the topic
  - problem stated clearly?
  - purpose?
  - significance?

- **Hypothesis or Research Question(s)**
  - Clearly stated?
  - Relevant?
  - Related to your area of interest?

- **Assumptions**
  - Explicit assumptions?
  - Implicit assumptions
  - Similar to yours?
Critically Analyzing the Literature

☑ Delimitations
  ✤ How was the study narrowed?
  ✤ Which considerations are relevant to your study?

☑ Definitions
  ✤ Key concepts & terms?
Critically Analyzing the Literature

☑ Method
- research design?
- population & sample?
- measurement?
- procedures?

☑ Findings
- make sense?
- what do they say about your area of interest?

☑ Discussion
- Presented clearly?
- Meaningful interpretations?
- Implications discussed?
- Suggestions or recommendations?
- Limits to practical application?

☑ Conclusion
- What did you learn?
- Re-state your new knowledge
Organizing the Literature Search:  
the Tree Diagram
A ‘good’ literature review.....

is a synthesis of available research
is a critical evaluation
has appropriate breadth and depth
has clarity and conciseness
uses rigorous and consistent methods
A ‘poor’ literature review is.....

.....an annotated bibliography
.....confined to description
.....narrow and shallow
.....confusing and longwinded
.....constructed in an arbitrary way
Preparations in writing the literature review !!!

👋 Clarify
- If your assignment is not very specific, seek clarification from your colleagues.
- Roughly how many sources should you include?
- What types of sources (books, journal articles, websites)?
- Summarize, synthesize, or critique your sources by discussing a common theme or issue.
- Evaluate your sources.
- Provide subheadings and other background information, such as definitions and/or a history.
Find models

Look for other literature reviews in your area of interest or in the discipline and read them to get a sense of the types of themes you might want to look for in your own research or ways to organize your final review. You can simply put the word "review" in your search engine (for an example in Elsevier Science).
Narrow your topic

The narrower your topic, the easier it will be to limit the number of sources you need to read in order to get a good survey of the material.

Consider your sources

In the sciences, for instance, treatments for medical problems are constantly changing according to the latest studies. Information even two years old could be obsolete. You can also use this method to consider what is "hot" and what is not.
Searching the Web
Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning
PC Blumenfeld, E Solórzano, RW Marx, JS Krajcik, M... - Educational Psychologist, 1991 - Lawrence Erlbaum
... Inc. Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning ... problems. PROJECT BASED LEARNING AS MOTIVATIONAL ...
Cited by 993 - Related articles - Web Search - All 2 versions

Doing with Understanding: Lessons From Research on Problem-and Project-Based Learning.
E.564523 - Doing with Understanding: Lessons From Research on Problem-and Project-Based Learning - ERIC Home ...
Cited by 143 - Related articles - Cached - Web Search - BL Direct - All 4 versions

Project-based learning using information technology
DG Mitsund - ISTE
Cited by 86 - Related articles - Web Search - Library Search - BL Direct

A Collaborative Model for Helping Middle Grade Science Teachers Learn Project-Based Instruction
... Science Education 83:6, 701. James Leehey, Thomas Tupper, Dale Musser, John Wideman.
(1993) A computer-mediated support system for project-based learning. ...
Cited by 170 - Related articles - Web Search - BL Direct - All 4 versions

Project-based learning with the world wide web: A qualitative study of resource integration
SM Land, BA Greene - Educational Technology Research and Development, 2000 - Springer
Page 1. Project-Based Learning with the ... Project-based learning aims to introduce more cognitively complex tasks into classrooms (Blumenfeld et al., 1991). ...
Zotero [zoh-TAIR-oh] is a free, easy-to-use Firefox extension to help you collect, manage, and cite your research sources. It lives right where you do your work—in the web browser itself.
Searching for phrase temporal databases

Restrict to: Header Title Order by: Expected citations Hubs Usage Date Temp 699 documents found. Only retrieving 250 documents (System busy - maximum 250).

Temporal and Real-Time Databases: A Survey - Ozsoyoglu, Snodgrass (1995) (Correct) Richard T. Snodgrass y Abstract A temporal database contains time-varying data. In that may benefit from cross infusion, namely, temporal database research for providing information at object creation time and stored in the temporal database or can be computed dynamically different from the provision of historical databases, temporal query languages [25, 27].


Interval-Based Conceptual Models for Time-Dependent Multimedia - Little, Chafou (1995) at object creation time and stored in the temporal database or can be computed dynamically different from the provision of historical databases, temporal query languages [25, 27].


Applying Update Streams in a Soft Real-Time Database System - Adelberg, Garcia-Molina, Kao (1995) (Correct) 66 citations database. Keywords: soft real-time, temporal databases, materialized views, updates. 1

www.cs.nwu.edu/~adelberg/papers/updates1.ps

Representing and Querying Changes in Semistructured Data - Chawathe, Abiteboul, Widom (1993) (Correct) 57 citations DHR36 and in the related problem of temporal databases [SA06, Soo11] However, we are not aware of to be queried. This is the approach taken by temporal databases [SA06, Soo11] The second approach, which www.rocq.inria.fr/~abiteboul/pub/dataeng97.ps

Temporal Deductive Databases - Beaudet, Chomicki, Wolper (1992) (Correct) 46 citations A.Seger, and R. Snodgrass, editors Temporal Databases (Benjamin Cummings, 1993) by Address:
ranging over the temporal domain. A temporal database is a finite collection of such relations.
For each paper consider the relationship between the Research Question, the Experiment, and the Results.
The type of review you write will reflect a great deal on the nature of the research that you are doing:

<table>
<thead>
<tr>
<th>The Research-based Project – theoretical orientation</th>
<th>Evaluation Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires most thorough investigation</td>
<td>Introduces history of system under evaluation</td>
</tr>
<tr>
<td>Introduces research trends and theory</td>
<td>Discuss evaluation techniques</td>
</tr>
<tr>
<td>Discusses a number of methods</td>
<td>Develop metrics based on previous work</td>
</tr>
<tr>
<td>Classifies their strengths and weaknesses</td>
<td></td>
</tr>
<tr>
<td>Introduces equations</td>
<td>Industry-Based Project</td>
</tr>
<tr>
<td>Points out gaps in the research</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Development Project</th>
<th>Problem Solving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduces previous relevant research</td>
<td>Discuss previous solutions</td>
</tr>
<tr>
<td>Discusses design methods</td>
<td>Discuss problem-solving techniques</td>
</tr>
<tr>
<td>Compare results with existing systems</td>
<td></td>
</tr>
<tr>
<td>Discuss techniques, graphs, etc.</td>
<td></td>
</tr>
</tbody>
</table>
How to review?

-The aim is to extract key points by comparing & contrasting ACROSS studies, instead of reading one paper after another.
-Key points for a review may concern areas of similarities and/or differences in:
-Research aim(s) or hypotheses
-Research design and sampling
-Instruments and procedures used
-How data were analysed
-Results or findings
-Interpretations
1\textsuperscript{st} output

<table>
<thead>
<tr>
<th>Feature map</th>
<th>Classifies and categorises your thought in tabular form</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concept map</strong></td>
<td>Links between concepts and processes, or shows relationship between ideas and practice</td>
</tr>
<tr>
<td><strong>Tree construction</strong></td>
<td>Shows how topic branches out into subthemes and related questions or represents stages in the development of a topic.</td>
</tr>
</tbody>
</table>
Writing the Literature Review

- Always begin with an introduction to the review & end with a summary
- Make the connection for the reader between the subtopics & the topic
- Use direct quotations infrequently

- Always cite your sources
- Present *your* knowledge on the topics & subtopics
- Summarize each subtopic
- Include a transition paragraph from one subtopic to the next
The purpose of this study is to determine the effect of poor coordination on the effective delivery of consultant services.

Example paragraph 1

Example paragraph 2
First Subtopic
Discussion should include:
- How is the subtopic connected to the problem?
- **Your** knowledge, based on the literature you have studied
- Specify subtopics (if any)
- **Summary & transition**

**Effective Organizational Structures**
In order for the coordination of services to be effective, a structure must exist within which service units are organized and can operate. Yaddah, yaddah, yaddah...

Long range strategic planning characterizes organizations with effective internal structures (Brown, 1997). Key to such an effort is the identification of...

- **Mission & Purpose**
- **Goals & objectives** (planning)
- **Task units**

So, given all that, yaddah, yaddah, it is important to note the role of...
## Writing tips......

<table>
<thead>
<tr>
<th>Sentences</th>
<th>Express one idea in a sentence. Ensure that all your sentences have a subject, verb and object.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paragraphs</td>
<td>Group sentences that express and develop one aspect of your topic. Use a new paragraph for another aspect or another topic.</td>
</tr>
<tr>
<td>Consistent Grammar</td>
<td>Use sentences and paragraphs with appropriate use of commas, colours and semi-colours. Incorrect use of punctuation can affect the meaning.</td>
</tr>
<tr>
<td>Transition Words</td>
<td>Use words that link paragraphs and which show contrast and development to your argument e.g. ‘hence’, ‘therefore’, ‘but’, ‘thus’, ‘as a result’, ‘in contrast’.</td>
</tr>
</tbody>
</table>
Example…….. (1)

Schematic diagram for video classification
Example…… (2)

See PWR Hot Leg

Source: Deendarlianto et al., 2012.
<table>
<thead>
<tr>
<th>Research</th>
<th>Technique</th>
<th>Features Used</th>
<th>Domain</th>
<th>Disadvantage / Advantage</th>
<th>Future Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lin et al. 2007</td>
<td>A priori algorithm</td>
<td>Audiovisual</td>
<td>Weather</td>
<td>Reduce the amount of misclassification errors.</td>
<td>Due to the different properties of the data sets representing the semantic concepts such as weather, commercial, and sports, they proposed to use different strategies to merge the rules.</td>
</tr>
<tr>
<td></td>
<td>Association rule mining</td>
<td></td>
<td>Sports</td>
<td>Able to identify a high percentage of positive instances in each concept</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-filtering architecture</td>
<td></td>
<td>Commercial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Davis &amp; Tyagi 2006</td>
<td>Probabilistic reliable-inference framework</td>
<td>Motion</td>
<td>Walking, running,</td>
<td>The system only makes classifications when it believes the input is 'good enough’ for discrimination between the possible actions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hidden Markov Model (HMM) output likelihoods and action priors</td>
<td></td>
<td>standing, bending-forward, crouching-down, and sitting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum likelihood (ML) and maximum a posteriori (MAP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>