



Metodologi Penelitian

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Jurusan Teknik Mesin dan Industri

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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

Research topics.....

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.

Example of literature review

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Nuclear Engineering and Design

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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?

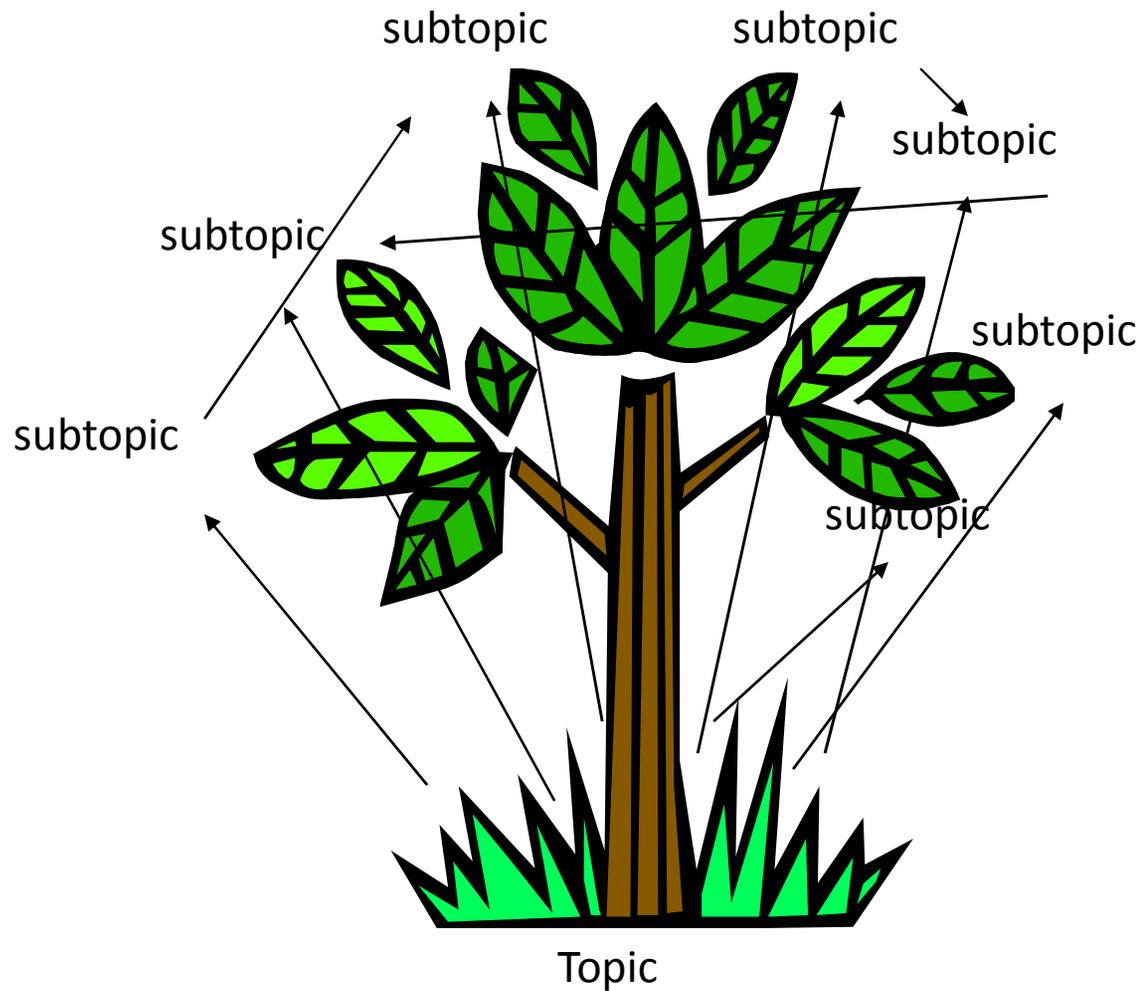
Discussion

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

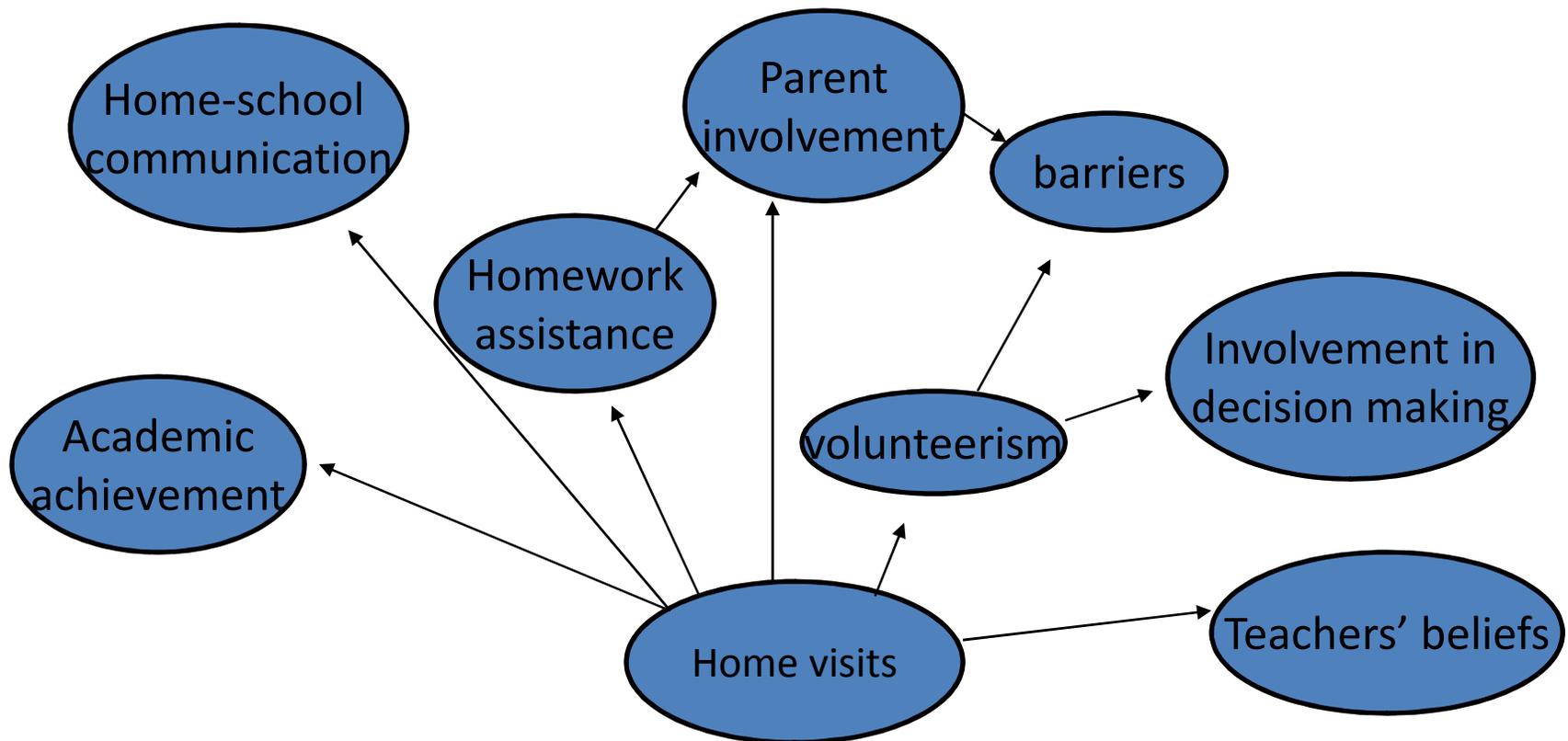
Conclusion

- ▶ What did you learn?
- ▶ Re-state your new knowledge

Organizing the Literature Search: *the Tree Diagram*



Tree Diagram Example



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

The screenshot shows a Mozilla Firefox browser window titled "Project-Based Learning" - Google Search. The address bar contains the search URL: <http://www.google.ie/search?hl=en&q='Project-Based+Learning'&btnG=Google+Search&meta=>. The search bar contains the text "Project-Based Learning" and the search button is labeled "Search". Below the search bar, there are radio buttons for "the web" (selected) and "pages from Ireland".

The search results are displayed under the heading "Web" and show "Results 1 - 10 of about 418,000 for 'Project-Based Learning'. (0.37 seconds)".

The first result is "Project Based Learning Checklists" from pbchecklist.4teachers.org/, described as "Age-appropriate, customizable project checklists for written reports, multimedia projects, oral presentations, and science projects." It has 12k views and is cached.

The second result is "Project-based learning - Wikipedia, the free encyclopedia". The snippet describes "Project-based learning, or PBL (often 'PjBL' to avoid confusion with 'Problem-based Learning'), is the use of classroom projects, intended to bring about ...". It has 36k views and is cached.

The third result is "Project Learning | Edutopia" from www.edutopia.org/project-learning, described as "Learn how to increase engagement and retention in your classroom with Edutopia's free Project-Based Learning professional-development courseware. ...". It has 24k views and is cached.

There is a section for "Video results for 'Project-Based Learning'" with two video thumbnails:

- "Project Based Learning: Mummified Chicken ..." from video.google.com, 30 min.
- "Picturing the Possibilities - Project-based ..." from www.youtube.com, 6 min.

Below the video results are two PDF links:

- "10. ASSESSING PROJECT-BASED LEARNING: A CASE STUDY OF AN ..." from www.aishe.org/readings/2005-2/chapter10.pdf, by C Carroll. It discusses the benefit from project-based learning, going back to the oft-used proverb - Tell me, and I will forget. Show me, and I may remember. ...
- "7. TUTORING PROJECT-BASED LEARNING: A CASE STUDY OF A THIRD YEAR ..."

The browser's taskbar at the bottom shows the Start button, open applications including Microsoft PowerPoint and "Project-Based Learn...", and the system tray with the time 12:23 and the Zotero logo.

"Project-Based Learning" - Google Search - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.google.ie/search?hl=en&q="Project-Based+Learning"&btnG=Google+Search&meta=

Comic Book Movies - I... http://www.comics2fil... http://www.superher... http://www.youtube... http://alanmoorenews... http://www.comp.dit.i... http://www.facebook... http://www.watchme...

Web Images News Groups Books Gmail more Sign in

Google "Project-Based Learning" Search Advanced Search Preferences

Search: the web

Results 1 - 10 of about 418,000 for "Project-Based Learning". (0.37 seconds)

Sponsored Links

Home Study Courses
College of Management & IT (CMIT)
Distance Learning. FETAC Registered
www.cmit.ie

Make Sense of Internet
Integrate Project-Based Learning
Into Your Classroom. 200+ ideas
www.iEARN.org

Collaborative Learning
Get Online Resources For Students
K-12. Connect and Learn Worldwide!
www.ThinkQuest.org

Project-Based Learning
Questia. Faster, easier research.
Online Books, Journals and Articles
www.Questia.com

Project Based Learning Checklists
Age-appropriate, customizable project checklists for presentations, and science projects.
pblchecklist.4teachers.org/ - 12k - Cached - Similar pages

Project-based learning - Wikipedia, the free encyclopedia
Project-based learning, or PBL (often "PjBL" to avoid confusion with "Problem-based Learning"), is the use of classroom projects, intended to bring about ...
en.wikipedia.org/wiki/Project-based_learning - 36k - Cached - Similar pages

Project Learning | Edutopia
Learn how to increase engagement and retention in your classroom with Edutopia's free Project-Based Learning professional-development courseware. ...
www.edutopia.org/project-learning - 24k - Cached - Similar pages

Video results for "Project-Based Learning"

Project Based Learning: Mummified Chicken ...
30 min
video.google.com

Picturing the Possibilities - Project-based ...
6 min
www.youtube.com

[PDF] 10. ASSESSING PROJECT-BASED LEARNING: A CASE STUDY OF AN ...
File Format: PDF/Adobe Acrobat - View as HTML
benefit from project-based learning, going back to the oft-used proverb - Tell me, and I will forget. Show me, and I may remember. ...
www.aishe.org/readings/2005-2/chapter10.pdf - Similar pages
by C Carroll - Related articles - All 2 versions

[PDF] 7. TUTORING PROJECT-BASED LEARNING: A CASE STUDY OF A THIRD YEAR ...
FILE PDF/A...
http://scholar.google.com/scholar?hl=en&q="Project-Based+Learning"&um=1&ie=UTF-8&sa=N&tab=ws

zotero

start Microsoft PowerPoint ... "Project-Based Learni...

EN 12:24

Google Scholar BETA "Project-Based Learning" Search

Advanced Scholar Search
Scholar Preferences
Scholar Help

Scholar All articles - [Recent articles](#) Results 1 - 10 of about 10,900 for "Project-Based Learning". (0.35 seconds)

[Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning](#)
PC Blumenfeld, E Soloway, RW Marx, JS Krajcik, M... - Educational Psychologist, 1991 - Lawrence Earlbaum
... Inc. Motivating **Project-Based Learning**: Sustaining the Doing, Supporting
the Learning ... problems. **PROJECT-BASED LEARNING AS MOTIVATIONAL ...**
[Cited by 593](#) - [Related articles](#) - [Web Search](#) - [All 2 versions](#)

[Doing with Understanding: Lessons From Research on Problem-and Project-Based Learning](#)
BJS Barron, DL Schwartz, NJ Vye, A Moore, A... - Journal of the Learning Sciences, 1998 - eric.ed.gov
EJ584623 - 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](#)

[CITATION] ... (1998). Doing with understanding: Lessons from research on problem-and **project-based learning**
BJS Barron, DL Schwartz, NJ Vye, A Moore, A... - The Journal of the Learning Sciences
[Cited by 80](#) - [Related articles](#) - [Web Search](#)

[BOOK] **Project-based learning** using information technology
DG Moursund - ISTE
[Cited by 85](#) - [Related articles](#) - [Web Search](#) - [Library Search](#) - [BL Direct](#)

[A Collaborative Model for Helping Middle Grade Science Teachers Learn Project-Based Instruction](#)
JS Krajcik, PC Blumenfeld, RW Marx, E Soloway - The Elementary School Journal, 1994 - UChicago Press
... Science Education 83:6, 701. James Laffey, Thomas Tupper, Dale Musser, John Wedman.
(1998) 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). ...

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Search support

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.

[download 1.0](#)

Latest version: **1.0.10** — maximum stability

[try out 2.0 beta](#)

Latest version: **2.0b7.2** — newest features

Which version should I use?

Having trouble installing?

Minimum Requirements

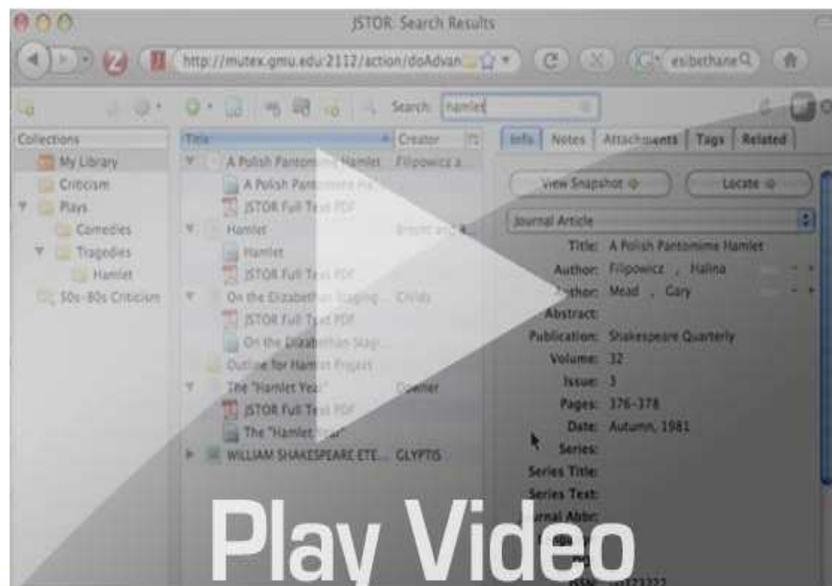
Firefox 3.0 for Windows, Mac, or Linux

Zotero News

National Science Foundation Hires Zotero October 5, 2009

Follow Libraries and Collections with Feeds June 30, 2009

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Play Video

Select Items

Select which items you'd like to add to your library

- Temporal and Real-Time Databases: A Survey - Ozsoyoglu, Snodgrass (1995)
- Interval-Based Conceptual Models for Time-Dependent Multimedia...
- Temporal Query Languages: a Survey - Chomicki (1995)
- Constraint Programming and Database Query Languages - Kanellakis, Goldin (1994)
- Applying Update Streams in a Soft Real-Time Database System - Adelberg, Garcia-Molina, Kao (1995)
- Representing and Querying Changes in Semistructured Data - Chawathe, Abiteboul, Widom (1998)
- Temporal Deductive Databases - Baudinet, Chomicki, Wolper (1992)
- Path Caching: A Technique for Optimal External Searching - Ramakrishnan (1993)
- A Survey of Schema Versioning Issues for Database Systems - Ramakrishnan (1993)
- Sequence Query Processing - Seshadri, Livny, Ramakrishnan (1993)
- Topological Queries in Spatial Databases - Papadimitriou, Suciu, Vlachos (1993)
- On Packing R-trees - Kamel, Faloutsos (1993)

Select All Deselect All

OK Cancel

Searching for **PHRASE temporal databases**.

Restrict to: [Header](#) [Title](#) Order by: [Expected citations](#) [Hubs](#) [Usage](#) [Date](#) Try
899 documents found. **Only retrieving 250 documents (System busy - maximum r**

[Temporal and Real-Time Databases: A Survey - Ozsoyoglu, Snodgrass \(1995\)](#) (Correct) (72 citations)
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 confman.unik.no/~paalh/ARTIKLER/T-RT-DBS.ps.Z

[Interval-Based Conceptual Models for Time-Dependent Multimedia ... - Little, Ghafoor \(1993\)](#) (Correct) (58 citations)
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] hulk.bu.edu/pubs/papers/1993/little-tkde93/TR-05-07-93.ps.gz

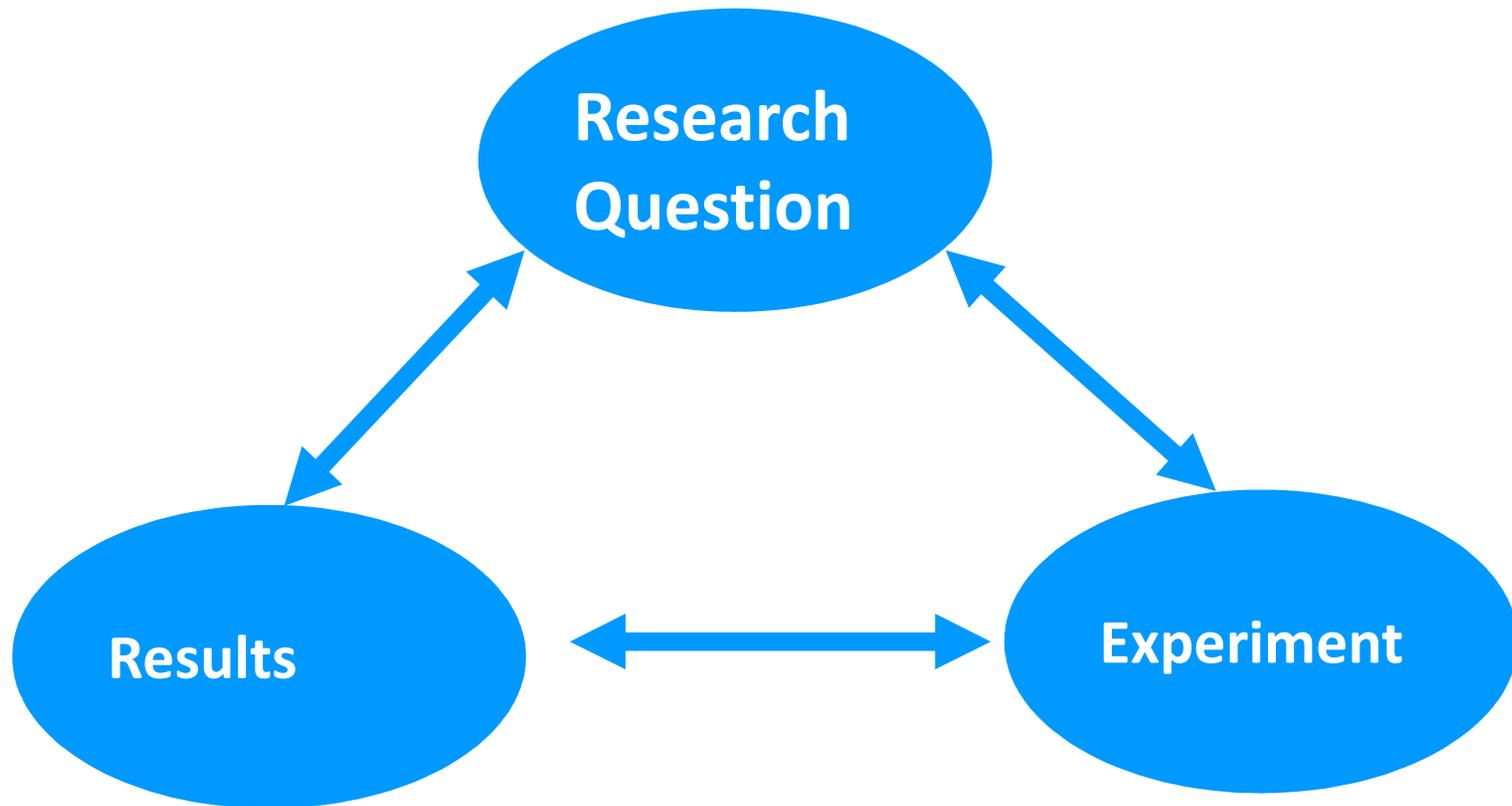
[Temporal Query Languages: a Survey - Chomicki \(1995\)](#) (Correct) (72 citations)
y January 24, 1995 Category: Survey Area: **Temporal Databases** Abstract We define formal notions of temporal domain and **temporal database**, and use them to study 129.130.10.93/~schmidt/techreport/ftp/pub/CIS/CIS/Chomicki/ict94.ps.Z

[Constraint Programming and Database Query Languages - Kanellakis, Goldin \(1994\)](#) (Correct) (58 citations)
databases, where dense order is present. **Temporal databases** require the development of analogous CQLs. Constraints offer useful approaches to **temporal databases** as well. For recent developments in ftp.cs.brown.edu/pub/techreports/94/cs94-31.ps.Z

[Applying Update Streams in a Soft Real-Time Database System - Adelberg, Garcia-Molina, Kao \(1995\)](#) (Correct) (58 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 \(1998\)](#) (Correct) (57 citations)
DHR96]and in the related problem of **temporal databases** [SA86, Soo91]However, we are not aware of to be queried. This is the approach taken by **temporal databases** [SA86, Soo91]The second approach, which www-rocq.inria.fr/~abitebou/pub/dataeng97.ps

[Temporal Deductive Databases - Baudinet, Chomicki, Wolper \(1992\)](#) (Correct) (48 citations)
A. Segev, and R. Snodgrass, editors, **Temporal Databases** (Benjamin/Cummings, 1993)y Address: ranging over the temporal domain T .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 :

- The Research-based Project – theoretical orientation

- Requires most thorough investigation
- Introduces research trends and theory
- Discusses a number of methods
- Classifies their strengths and weaknesses
- Introduces equations
- Points out gaps in the research

- Development Project

- Introduces previous relevant research
- Discusses design methods
- Compare results with existing systems
- Discuss techniques, graphs, etc.

- Evaluation Project

- Introduces history of system under evaluation
- Discuss evaluation techniques
- Develop metrics based on previous work

- Industry-Based Project

- Introduces history of industry
- Discusses previous techniques and their refinements
- Discuss analysis of previous results

- Problem Solving

- Discuss previous solutions
- Discuss problem-solving techniques

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

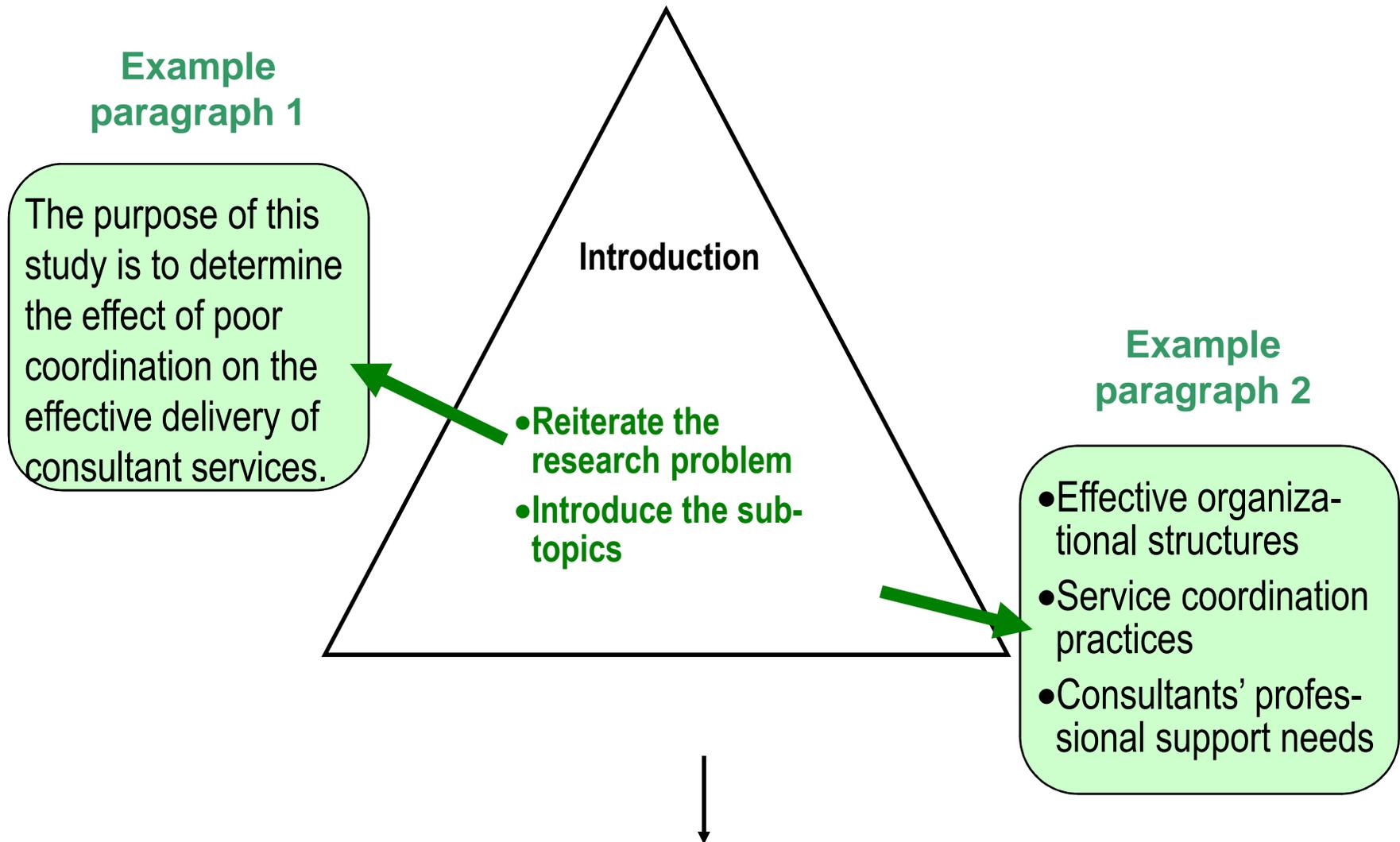
1st output

Feature map	Classifies and categorises your thought in tabular form
Concept map	Links between concepts and processes, or shows relationship between ideas and practice
Tree construction	Shows how topic branches out into subthemes and related questions or represents stages in the development of a topic.

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

Organizing the Literature Review



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...

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

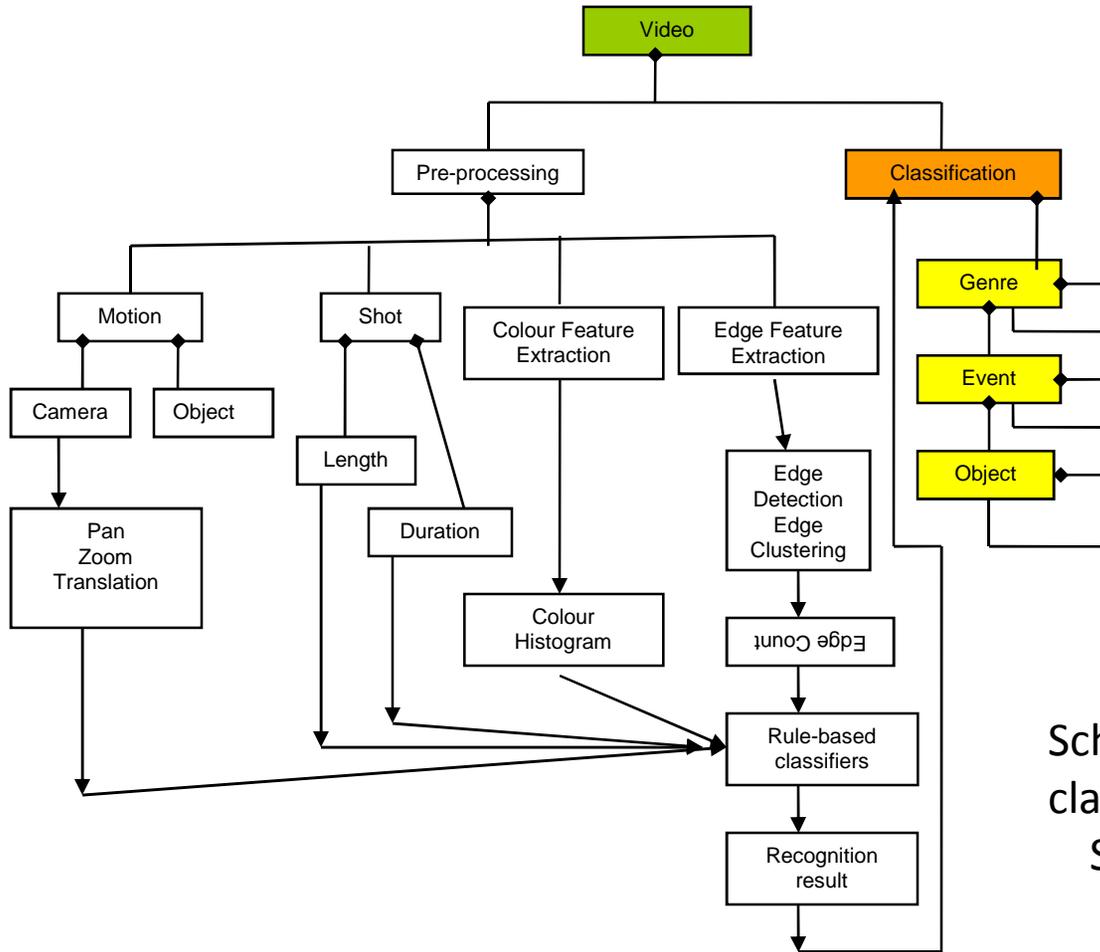
- Mission & Purpose
- Goals & objectives (planning)
- Task units

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

Writing tips.....

Sentences	Express one idea in a sentence. Ensure that all your sentences have a subject, verb and object.
Paragraphs	Group sentences that express and develop one aspect of your topic. Use a new paragraph for another aspect or another topic.
Consistent Grammar	Use sentences and paragraphs with appropriate use of commas, colons and semi-colons. Incorrect use of punctuation can affect the meaning.
Transition Words	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'.

Example..... (1)



Schematic diagram for video classification

Source: L.N. Abdullah et al. 2005.

Example..... (2)

See PWR Hot Leg

Source: Deendarlianto et al., 2012.

Research	Technique	Features Used	Domain	Disadvantage / Advantage	Future Direction
Lin et al. 2007	<p>A priori algorithm</p> <p>Association rule mining</p> <p>Pre-filtering architecture</p>	Audiovisual	<p>Weather</p> <p>Sports</p> <p>Commercial</p>	<p>Reduce the amount of misclassification errors.</p> <p>Able to identify a high percentage of positive instances in each concept</p>	<p>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.</p>
Davis & Tyagi 2006	<p>Probabilistic reliable-inference framework</p> <p>Hidden Markov Model (HMM) output likelihoods and action priors</p> <p>Maximum likelihood (ML) and maximum a posteriori (MAP)</p>	Motion	<p>Walking, running, standing, bending-forward, crouching-down, and sitting</p>	<p>The system only makes classifications when it believes the input is 'good enough' for discrimination between the possible actions</p>	