3.1 Making a Literature Review
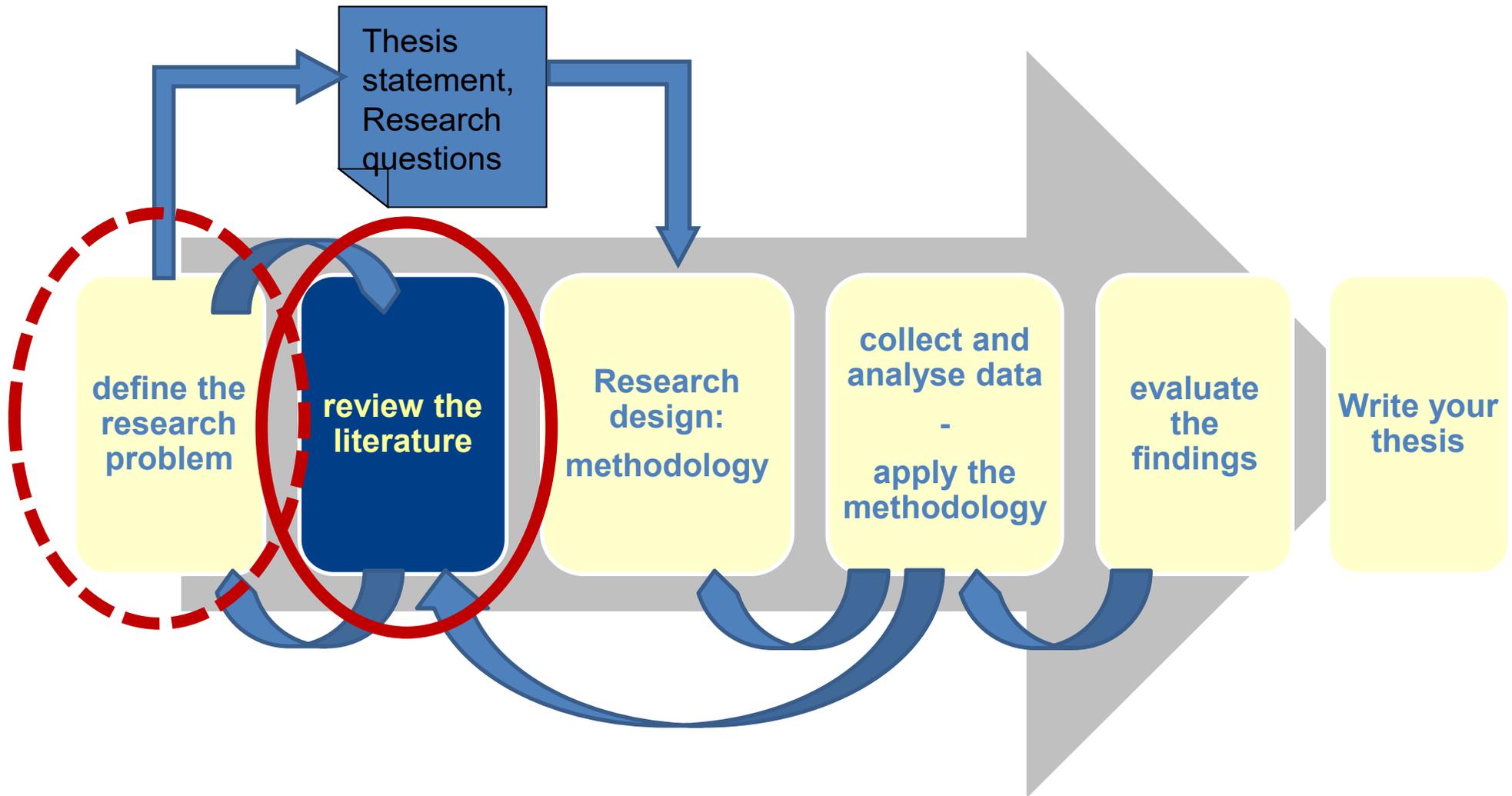
Knut Hinkelmann

Research Process

The research process is meant as a guidance for you

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

2

The Body of Knowledge (BOK)

- Researchers in a field build up a community

  - ♦ **publications** build up their body of knowledge: journals, conference proceedings

  - ♦ **communication** also takes place in other ways, e.g. at conferences and workshops, in discussion groups etc.

- Knowing the current status of the Body of Knowledge (BoK) in the given research field is an essential first step for any research project.

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

3

Reasons for becoming familiar with the BoK

- At the beginning of your research

  - Identify the research problem: What is already known and what is needed to be known?

- While doing the research

  - learn how others handled a research project similar to yours

  - discover new ideas and approaches

  - find solutions to particular problems of your research project

- Always:

  - find significant researchers and establish valuable social contacts

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

4

Purpose of a Literature Review at the Start of the Research
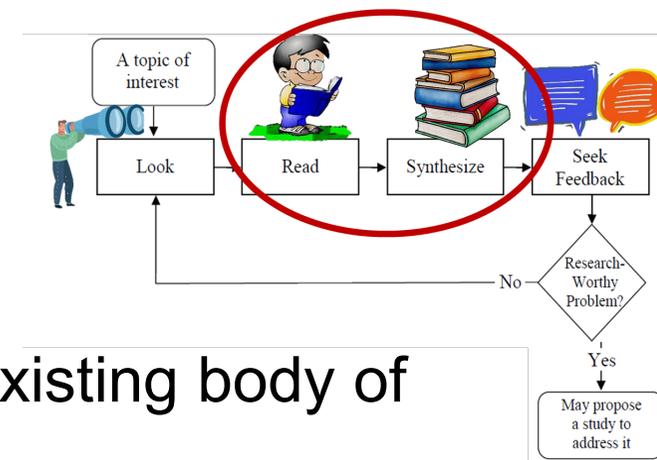
1. Helping the researcher understand the existing body of knowledge:
   - What is already known?
   - What is needed to be known?

2. Providing a solid theoretical foundation for the proposed study (related to "what is already known?")

3. Substantiating the presence of the research problem (related to "what is needed to be known?")

4. Justifying that the proposed study contributes something new to the Body of Knowledge

5. Framing the valid research methodologies, approach, goals, and research questions for the proposed study

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

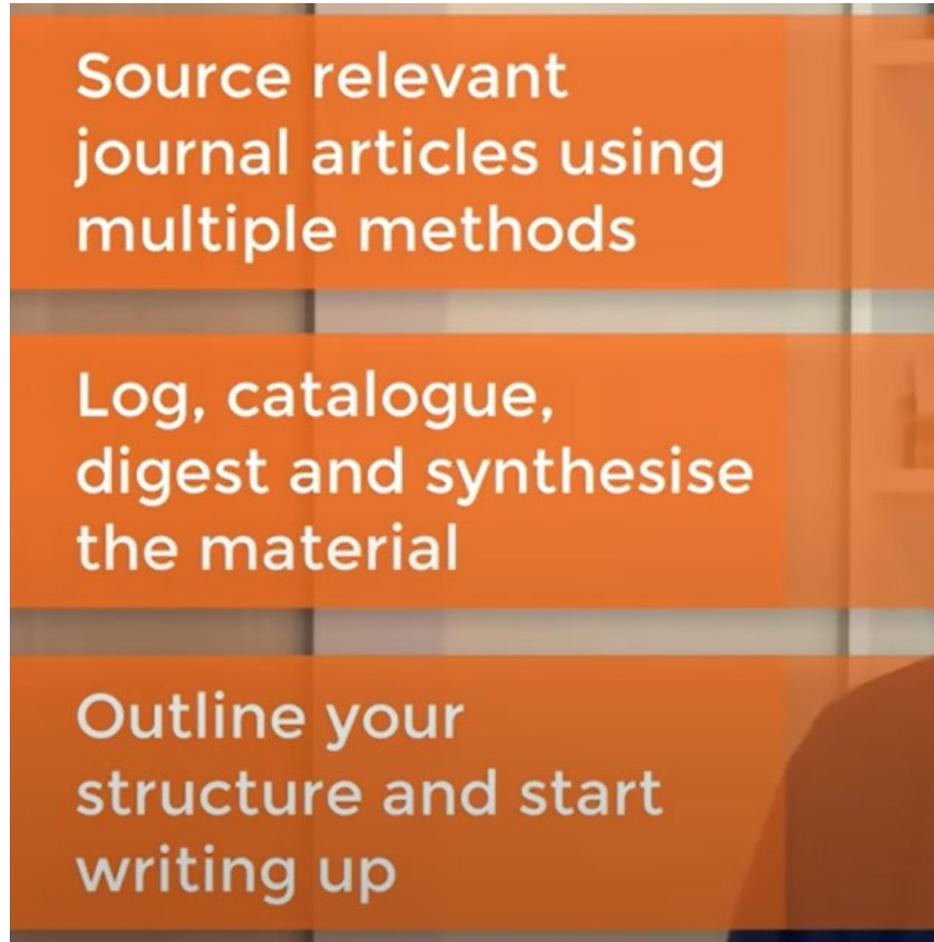Based on (Levy & Ellis 2006)

5

Literature Review: Process and Chapter

A literature review can be see as to things:

♦ The **Process** of reviewing existing literature

♦ A **Chapter** in the thesis/paper

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

6

Literature Review Chapter

■ The research typically starts with a literature review, which is written in chapter 2 of your thesis

■ The literature review contains secondary literature – work previously published by other scholars.

■ A good literature review is *comprehensive*, *critical* and *contextualized*

■ A good literature review shows:

  ♦ That you are aware of what is going on in the field

  ♦ That there is a theory base for the work you are proposing to do

  ♦ How your work fits in with what has already been done

  ♦ That your work has significance

  ♦ That your work will lead to new knowledge.

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

Thanks to Prof. Alta van der Merwe

7

3 Steps

Source relevant journal articles using multiple methods

Log, catalogue, digest and synthesise the material

Outline your structure and start writing up

Gradcoach: How To Write A Literature Review In 3 Simple Steps,
https://www.youtube.com/watch?v=lw8HPXJP1VA

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

8

Three Stages of Effective Literature Review Process
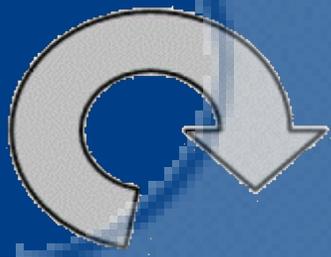
1. Input   2. Processing   3. Output

Keyword Search →

Backward Search →

Forward Search →

1. Know the literature
2. Comprehend the literature
3. Apply
4. Analyze
5. Synthesize
6. Evaluate

→ Evidence
↓
Warrent
↓
Claim

(Levy & Ellis 2006)

1. Input: Sourcing relevant Literature

Quality of Literature

■ General criteria for the quality of a publication:

  ♦ **peer-reviewed!**

  ♦ international

  ♦ quality of journal or conference (impact factor)

  ♦ recent

■ First consider *journals, conference proceedings*, books

  ♦ Journals are rated higher than conference proceedings

  ♦ But: conferences proceeding contain more recent work

■ Don't trust non-refereed sources like blogs or websites

  ♦ you don't know the quality

  ♦ they might be biased (companies, sponsorship, …)

  ♦ (Problem: descriptions and discussions of new technology often appears in non-refereed work or in questionable sources)

■ Use wikipedia only for introduction or background ideas - don't reference

Top Journals and Conferences

Top Journals in Information Systems

	Rank	Journal Name
Premier Journals	1	MIS Quarterly
	2	Information Systems Research
	3	Management Science
	4	Journal of Management Info. Systems
Top Tier Journals	5	Decision Sciences
	6	Communications of the ACM
	7	Decision Support Systems
	8	European Journal of Info. Systems
	9	ACM Transactions
	10	Journal of AIS
	11	Information Systems
	12	ACM Computing Surveys
	13	Journal of Information Systems
	14	Journal of Strategic Info. Systems
	15	Information and Management
	16	Communications of the AIS
	17	Journal of Database Management
	18	Journal of Information Management
	19	DATA BASE
	20	Journal of Computer Info. Systems
	21	Info. Resources Management Journal
	22	Journal of Management Systems
	23	Journal of the ACM
	24	Omega
	25	Journal of Info. Systems Management
	26	Journal of Information Science
	27	Human-Computer Interaction
	28	Operations Research
	29	Interfaces (INFORMS)
	30	Int'l Journal of Human-Computer Studies
	31	Journal of Information Systems Educ.
	32	Knowledge Based Systems
	33	Journal of Operations Research
	34	Journal of Data Base Administration
	35	Journal of Systems and Software
	36	Expert Systems with Applications
	37	Organizational Behavior and Human Decision
	38	Journal of Systems Management
	39	INFOR
	40	Expert Systems Review
	41	Journal of End-User Computing
	42	Behavior and Information Technology
	43	Communication Research
	44	Simulation
	45	AI Expert
	46	Journal of Software Maintenance
	47	Computers and Automation
	48	Computers in Human Behavior

Top Conferences Information Systems

Hindex	Publisher	Conference Details
86	ACM Association for Computing Machinery	SIGKDD : ACM SIGKDD International Conference on Knowledge discovery and data mining Aug 22, 2020 - Jan 1, 1970 - San Diego , United States https://www.kdd.org/kdd2020/
74	ACM Association for Computing Machinery	VLDB : International Conference on Very Large Databases Aug 31, 2020 - Sep 4, 2020 - Tokyo , Japan https://vldb2020.org/
67	ACM Association for Computing Machinery	SIGMOD : ACM SIGMOD International Conference on Management of Data Jun 14, 2020 - Jun 19, 2020 - Portland , United States https://sigmod2020.org/
63	ACM Association for Computing Machinery	STOC : ACM Symposium on Theory of Computing Jun 22, 2020 - Jan 1, 1970 - Chicago , United States http://acm-stoc.org/stoc2020/
55	ACM Association for Computing Machinery	SIGIR : ACM SIGIR Conference on Research and development in information retrieval Jul 26, 2020 - Jul 30, 2020 - XI\'AN , China https://sigir.org/sigir2020/
53	IEEE	ISIT : IEEE International Symposium on Information Theory Jun 21, 2020 - Jun 26, 2020 - Los Angeles , United States https://2020.ieee-isit.org/
52	PMLR	AISTATS : International Conference on Artificial Intelligence and Statistics Jun 3, 2020 - Jun 5, 2020 - Palermo , Italy https://www.aistats.org/
51	IEEE	FOCS : IEEE Symposium on Foundations of Computer Science Nov 16, 2020 - Nov 19, 2020 - Durham , United States https://focs2020.cs.duke.edu/
48	PMLR	COLT : Conference on Learning Theory (COLT) Jul 9, 2020 - Jul 12, 2020 - Graz , Austria http://learningtheory.org/colt2020/
48	ACM Association for Computing Machinery	CIKM : ACM International Conference on Information and Knowledge Management Oct 19, 2020 - Oct 23, 2020 - Galway , Ireland https://cikm2020.org/call-for-papers-full-and-short-research-papers/
43	Springer	FC : International Conference on Financial Cryptography and Data Security Feb 17, 2020 - Feb 21, 2020 - Kota Kinabalu , Malaysia https://fc20.ifca.ai/
43	IEEE	SC : International Conference for High Performance Computing, Networking, Storage and Analysis Nov 15, 2020 - Nov 20, 2020 - Atlanta , United States https://sc20.supercomputing.org/submit/paper-submissions/

http://www.guide2research.com/topconf/

http://www1.chapman.edu/~bdehning/MIS%20Journal%20Rankings.htm

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

13

Top Conferences

Software Engineering

Hindex	Publisher	Conference Details
75	ACM	ICSE : International Conference on Software Engineering May 23, 2020 - May 29, 2020 - Seoul , South Korea https://conf.researchr.org/home/icse-2020
56	ACM	ASPLOS : International Conference on Architectural Support for Prog and Operating Systems Mar 16, 2020 - Mar 20, 2020 - Lausanne , Switzerland https://asplos-conference.org/cals/
51	ACM	PLDI : ACM SIGPLAN Conference on Programming Language Design (PLDI) Jun 15, 2020 - Jun 20, 2020 - London , United Kingdom https://pldi20.sigplan.org/home
51	IEEE	FOCS : IEEE Symposium on Foundations of Computer Science Nov 16, 2020 - Nov 19, 2020 - Durham , United States https://focs2020.cs.duke.edu/
51	ACM	FSE : ACM SIGSOFT International Symposium on Foundations of Soft Nov 8, 2020 - Nov 13, 2020 - Sacramento , United States https://www.cs.ucdavis.edu/fse2020/
51	ACM	POPL : ACM SIGPLAN-SIGACT Symposium on Principles of Program (POPL) Jan 17, 2021 - Jan 22, 2021 - Copenhagen , Denmark https://popl21.sigplan.org/
49	usenix	OSDI : Symposium on Operating Systems Design and Implementation Nov 4, 2020 - Nov 6, 2020 - BANFF , Canada https://www.usenix.org/conference/osdi20
48	ACM	DAC : Design Automation Conference (DAC) Jul 19, 2020 - Jul 23, 2020 - San Francisco , United States https://www.dac.com/
47	Springer	RSS : Robotics: Science and Systems Jul 12, 2020 - Jul 17, 2020 - Oregon State University at Corvallis , United States https://roboticsconference.org
46	ACM	UIST : ACM Symposium on User Interface Software and Technology Oct 20, 2020 - Oct 23, 2020 - Minneapolis , United States https://uist.acm.org/uist2020/
46	ACM	SODA : ACM SIAM Symposium on Discrete Algorithms Jan 10, 2021 - Jan 13, 2021 - Alexandria , United States https://www.siam.org/conferences/cm/conference/soda21
44	ACM	Mobisys : Annual International Conference on Mobile Systems, Appli Jun 15, 2020 - Jun 19, 2020 - Toronto , Canada https://www.sigmobile.org/mobisys/2020/

Computer Science

Hindex	Publisher	Conference Details
240	IEEE	CVPR : IEEE/CVF Conference on Computer Visio Jun 16, 2020 - Jun 18, 2020 - Seattle , United States http://cvpr2020.thecvf.com/
169	Neural Information Processing Systems Foundation	NeurIPS : Neural Information Processing Systen Dec 6, 2020 - Dec 12, 2020 - Vancouver , Canada https://nips.cc/Conferences/2020/CallForPapers
137	Springer	ECCV : European Conference on Computer Visio Aug 23, 2020 - Aug 28, 2020 - Glasgow , United Kin https://eccv2020.eu/
135	aaai	ICML : International Conference on Machine Le Jul 13, 2020 - Jan 1, 1970 - Vienna , Austria https://icml.cc/Conferences/2020
129	IEEE	ICCV : IEEE/CVF International Conference on C Oct 11, 2021 - Oct 17, 2021 - Montreal , Canada https://iccv2021.thecvf.com/home
106	ACL	ACL : Meeting of the Association for Computatio Jul 5, 2020 - Jul 10, 2020 - Seattle , United States https://acl2020.org/
95	aaai	AAAI : AAAI Conference on Artificial Intelligen Feb 2, 2021 - Feb 9, 2021 - Vancouver , Canada https://aaai.org/Conferences/AAAI-21/
88	ACL	EMNLP : Conference on Empirical Methods in Na Nov 16, 2020 - Nov 20, 2020 - Online , United State https://2020.emnlp.org
87	ACM	CHI : Computer Human Interaction (CHI) May 8, 2021 - May 13, 2021 - Yokohama , Japan https://chi2021.acm.org/
86	ACM	SIGKDD : ACM SIGKDD International Conferen Aug 22, 2020 - Jan 1, 1970 - San Diego , United Sta https://www.kdd.org/kdd2020/
82	IEEE	ICRA : IEEE International Conference on Robot May 31, 2020 - Jun 4, 2020 - Paris , France https://www.icra2020.org/
82	ACM	CCS : ACM Symposium on Computer and Commu Nov 9, 2020 - Nov 13, 2020 - Orlando , United State https://www.sigsac.org/ccs/CCS2020/

Information Systems

Hindex	Publisher	Conference Details
86	ACM	SIGKDD : ACM SIGKDD International Conference on Knowledge discovery and data mining Aug 22, 2020 - Jan 1, 1970 - San Diego , United States https://www.kdd.org/kdd2020/
74	ACM	VLDB : International Conference on Very Large Databases Aug 31, 2020 - Sep 4, 2020 - Tokyo , Japan https://vldb2020.org/
67	ACM	SIGMOD : ACM SIGMOD International Conference on Management of Data Jun 14, 2020 - Jun 19, 2020 - Portland , United States https://sigmod2020.org/
63	ACM	STOC : ACM Symposium on Theory of Computing Jun 22, 2020 - Jan 1, 1970 - Chicago , United States http://acm-stoc.org/stoc2020/
55	ACM	SIGIR : ACM SIGIR Conference on Research and development in information retrieval Jul 26, 2020 - Jul 30, 2020 - XI'AN , China https://sigir.org/sigir2020/
53	IEEE	ISIT : IEEE International Symposium on Information Theory Jun 21, 2020 - Jun 26, 2020 - Los Angeles , United States https://2020.ieee-isit.org/
52	PMLR	AISTATS : International Conference on Artificial Intelligence and Statistics Jun 3, 2020 - Jun 5, 2020 - Palermo , Italy https://www.aistats.org/
51	IEEE	FOCS : IEEE Symposium on Foundations of Computer Science Nov 16, 2020 - Nov 19, 2020 - Durham , United States https://focs2020.cs.duke.edu/
48	PMLR	COLT : Conference on Learning Theory (COLT) Jul 9, 2020 - Jul 12, 2020 - Graz , Austria http://learningtheory.org/colt2020/
48	ACM	CIKM : ACM International Conference on Information and Knowledge Management Oct 19, 2020 - Oct 23, 2020 - Galway , Ireland https://cikm2020.org/call-for-papers-full-and-short-research-papers/
43	Springer	FC : International Conference on Financial Cryptography and Data Security Feb 17, 2020 - Feb 21, 2020 - Kota Kinabalu , Malaysia https://fc20.ifca.ai/
43	IEEE	SC : International Conference for High Performance Computing, Networking, Storage and Analysis Nov 15, 2020 - Nov 20, 2020 - Atlanta , United States https://sc20.supercomputing.org/submit/paper-submissions/

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

http://www.guide2research.com/topconf/

14

Open Access

- Open access is a set of principles and a range of practices through which research outputs are distributed without financial, legal or technical barriers to accessing it
  - ♦ distributed online
  - ♦ free of access charges
  - ♦ open licences

- Many open access journal with "reversed" fee:
  - ♦ Authors pay for being published

Be aware of predatory journals

Beall's list of potiential predatory journals anssd publishers: https://beallslist.net/

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

15

Literature Sources (1) - Online Resources (a)

- **Search Engines**

  - Google Scholar (https://scholar.google.com)
    - Easy to use, large, only full-text search, many download links
  - Semantic Scholar (https://www.semanticscholar.org/)
    - AI-Powered literarure search

- **Publisher-neutral citation indexes – quality checked**

  - Scopus (https://scopus.com)
    - Largest citation database, free access provided by FHNW
  - Science Direct (https://www.sciencedirect.com/)
  - Web of Science
  - DBLP (https://dblp.uni-trier.de/) - Specialised to Computer Science

- **Social Software - Sharing of publications**

  - ResearchGate
  - Academia.edu

Literature Sources (2) – Publisher sites

- ACM and IEEE are associations, which organize conferences and publish journals
  - ♦ ACM Digital Library (https://dl.acm.org)
  - ♦ IEEE Xplore (https://ieeexplore.ieee.org/)

- Websites of commercial publishers, e.g.
  - ♦ Springerlink (https://link.springer.com/)

- These publishers provide online access only to their publications

- The contents of these sources are mostly included in citation databases like Scopus, DBLP, Web of Science or accessible via Google

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

17

ScienceDirect vs. Scopus
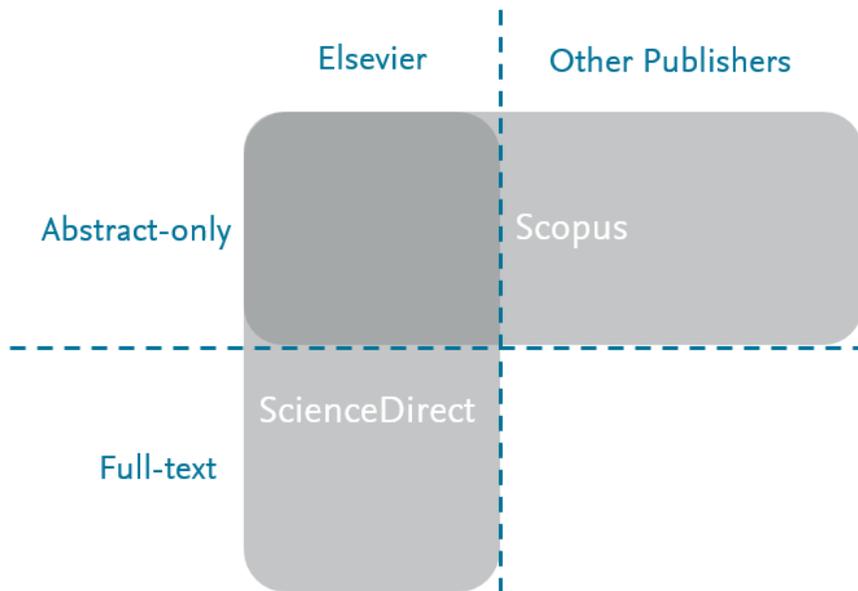
- **ScienceDirect** contains *full text articles* from journals and books, primarily published by *Elsevier*, but including some hosted societies.

- **Scopus** indexes *metadata* from *abstracts* and *references* of *thousands of publishers*, including Elsevier. Scopus builds additional functionality on top of that metadata, such as citation matching, author profiles, and affiliation profiles.

- Scopus indexes nearly the entire ScienceDirect database, but without the articles' full text. Scopus builds the profiles and metrics using that data.

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

18

Techniques for Literature Search

■ Keyword Searching

■ Backward Searching

■ Forward Searching

Mastering all three techniques is key

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

19

Keyword Searching

- Querying of quality scholarly databases by the use of a specific word or phrase

- Use of reliable online resource

- Key issue
  - ◆ Selection of keywords

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

20

Determining Keywords

- Determining appropriate keywords is essential

- Coldstart problem: How to find keywords for an unknown domain?

  - ◆ Look in the literature ☹

  - ◆ Make initial search with topic keywords

  - ◆ Ask your supervisor
    - ● Key theories and concepts
    - ● Key authors
    - ● Key papers
    - ● Key journals and conferences

- Revise your keywords based on intermediate search results

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

21

Problems with Keywords

- Problems with keywords
  - ♦ Keywords have limited time span
    - Application Service Providing → Cloud Computing
  - ♦ Buzzwords appear and disappear
    - Ontology → Knowledge Graphs
  - ♦ Over time, terms are used with different focus/meaning
    - Machine Learning – Artificial Intelligence
- Solution: Identify underlying constructs and theories

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

22

Findling Literature – Combining Search Strategies

*A common mistake by novice researchers [...]
is to assume that the keyword search yields all
that is available from the literature.*

■ The keyword search should be just the initial, not the main
step for a literature search.

*Except for Systematic Literature
Review, which is a research
method in its own rights*

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

23

Backward and Forward Search (Snowball)

Backward and forward approaches can help to follow models, theories, theoretical constructs, and research streams.

Backward Search:
Which papers are cited?

Relevant Article

Forward Search:
Who cited that paper?

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

24

Backward Searching

- Objective: learn more about the origins of construct, theory, or models under study.

    - *Backward references search:* review the references of the articles you already found

    - *Backward authors search:* review what the authors have published prior to the article.

- Only for relevant work

- Some online resources directly link to referenced work

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

25

Forward Searching

- Objective: Identify evolutions of construct, theory, or models as will as applications.

  - ◆ *Forward references search:* review additional articles that have cited the article.

  - ◆ *Forward authors search:* review what the authors have published following the article.

- You can use online resources to do forward search

  Example: Google Scholar

  Toward a technology for organizational memories
  A Abecker, A Bernardi, K Hinkelmann... - ... Systems and their ..., 1998 - ieeexplore.ieee.org
  To meet the growing need for enterprise-wide knowledge management, the authors have
  developed and fielded a three-layered model for processing knowledge. This article shows
  how their organizational memory serves as an intelligent assistant and deals with both ...
  ☆ 95 Cited by 625 Related articles All 17 versions Import into BibTeX

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

26

Citation Map with Forward and Backward Reference from IEEE Xplore

Citation Map

This view provides a high-level visual representation of references and citing documents for this article. To view the full listing, select "View All References" or "View All Citations".

View All References   View All Citations

Viewing: **Toward a technology for organizational memories**

References in this Article

1   "Enterprise Knowledge Management,"

2   "Some Principles of Knowledge Management,"

3   Designing Organizational Memory: Preserving Intellectual Assets in a Knowledge Economy,

4   "Knowledge Acquisition and Modeling for Corporate Memory: Lessons Learnt from Experience,"

5   The Knowledge-Creating Company,

This Article

Citations to this Article

1   Management of Twitter Resources in a Semantic Organizational Memory

2   Tying knowledge to action with kMail

3   Knowledge processes and ontologies

4   An intelligent agent-based knowledge broker for enterprise-wide healthcare knowledge procurement

5   Supporting software process performance analysis through a knowledge-based environment

Finding Literature – Combining Search Strategies

■ Possible strategy: Combine keyword, forward and backward search

♦ Keyword search for a first list of articles
- Identify key researcher, journals, conferences, theories

♦ Refine the search
- Perform forward/backward search for relevant articles
- Check most relevant journals and conferences
- Make specific keyword search for topics, authors, theories

How the get the Articles (1)

■ Many articles are available online

■ Example: Google Scholar often provides links for download

♦ to original sources, e.g. publisher sites

♦ to pre-print versions, e.g. on university or author websites

♦ to sharing platforms, e.g. research gates

[PDF] Understanding **Modeling** Requirements of **Unstructured Business Processes**.
ZA Bukhsh, M van Sinderen, K Sikkel, DAC Quartel - ICE-B, 2017 - ris.utwente.nl   [+ Paperpile]
Management of structured **business processes** is of interest to both academia and industry,
where academia focuses on the development of methods and techniques while industry
focuses on the development of supporting tools. With the shift from routine to knowledge ...
☆ ⁇ Cited by 9 Related articles All 4 versions Import into BibTeX ≫

[PDF] utwente.nl

Modeling structured and **unstructured processes**: An empirical evaluation
E Cardoso, K Labunets, F Dalpiaz... - ... on Conceptual **Modeling**, 2016 - Springer   [+ Paperpile]
... Despite the popularity of activity-centered, imperative **models**—as evidenced by large industrial
and academic adoption of the BPMN **modeling** language as de ... For **unstructured processes**,
however, execution order is context-dependent and even the activities needed are ...
☆ ⁇ Cited by 8 Related articles All 6 versions Import into BibTeX

[PDF] uu.nl

Flaws in the flow: The weakness of **unstructured business process modeling**
languages dealing with data
C Combi, M Gambini - ... International Conferences" On the Move to ..., 2009 - Springer   [+ Paperpile]
Abstract **Process**-Aware Information Systems (PAISs) need more flexibility for supporting
complex and varying human activities. PAISs usually support **business process** design by
means of graphical graph-oriented **business process modeling** languages (BPMLs) in ...
☆ ⁇ Cited by 56 Related articles All 11 versions Import into BibTeX

[PDF] researchgate.net

Caution: In references only use URL of original/ official source!

How the get the Articles (2)

- Check via the Library of Unicam

- If you struggle to get an article, consider to contact the author directly, e.g.

  - ♦ Researchgate

- Ask your supervisor

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

30

When You Are Done With the Literature Search?

- By default, the literature search process should continuously be done during the course of the study.

- Rule of thumb: the search is near completion when

  - ♦ you discover that new articles only introduce familiar arguments, methodologies, findings, authors, and studies.

  - ♦ no new citations are discovered and

  - ♦ articles cited in newly discovered literature have already been reviewed.

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

31

1. Know the literature
2. Comprehend the literature
3. Apply
4. Analyze
5. Synthesize
6. Evaluate

2. Processing Literature

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

33

Structuring Literature Review: Funnel Method

Introduction (Scope and structure)
Broad (Theory Base)
Your study
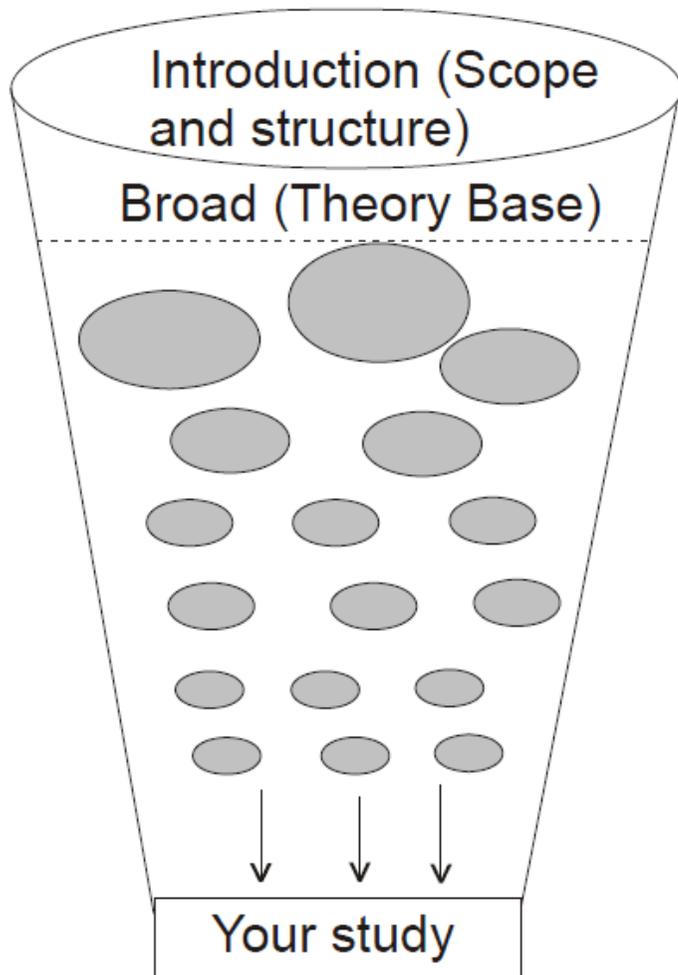
- Start with the theory base – the basic works in your field. Just an overview - don't go too much in details.

- Next level will be nearer to your work.

- The lower you go in your funnel, the nearer to the work that you are doing you will move

Thanks to Prof. Alta van der Merwe

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

34

Categorizing works
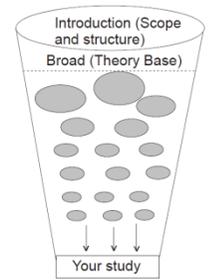
- Group works according to commonality.

- No rules on the number of groups or number of commonalities.

- Make notes on index cards, Endnote, categorizing in a file cabinet.

- Start with the theory base – the basic works in your field. These may be related to your field, but not necessary your focus. Relate to your topic rather than your thesis statement.

- Next level will be nearer to your work, but not a 100% match.

- The lower you go in your funnel, the nearer to the work that you are doing you will move.

Thanks to Prof. Alta van der Merwe

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

35

Academic Reading

- Be careful that you do not drown in the heap of available works.

- Know the top researchers in a field – start by investigating the top conferences – the newest work should be published there.

- Academic reading is done for a purpose:

  - ♦ You need to name your purpose BEFORE you start.

  - ♦ Skim each work to find out whether it is worth reading, or contains bits that are worth reading

- Once you find what you need,

  - ♦ Make sure you understand the information, and then

  - ♦ Extract what you need (make notes, "plagiarist file" ..)

Thanks to Prof. Alta van der Merwe

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

36

How to read a research article

- read title and author name(s)

- if still interesting: read abstract

  - ◆ usually these first 2 steps can be taken online before actually obtaining the article

- if still interesting: scan introductory section, browse the headings and subheadings, look through the bibliography

- if still interesting: check results and conclusions

- in the above, "interesting" means that the article is relevant to your own work

  - ◆ the closer your own research project is related to a paper the more detailed you need to read it

adapted from Thomas Hanne

Record your ideas .. Your ideas will become key concepts in your dissertation!

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

39

Keep Notes on Read Articles

■ Why?

  ♦ Because you quickly forget the content of the article and the relationship of the article to your work

■ What?

  ♦ bibliographic details (title, author etc.)
  ♦ what's interesting for you

■ How?

  ♦ Use Literature Management tools like Mendeley
  ♦ Copy relevant parts "plagiarist file" (A. van der Merwe)
  ♦ keep an overview of ideas/topics: catalogue and synthesize
    ● as a mind map
    ● in Excel
    ● …

Synthesize Literature

- Visualize how things fit together

- You can use

  - Mindmapping software
  - Whiteboard
  - Piece of paper

From Gradcoach: https://www.youtube.com/watch?v=lw8HPXJP1VA, 23:09

Cataloging your Literature

Cataloging literature can help to categorize literature and taking notes
Example: Excel

Construct/Concept	Literature Review	Type	Theory	Element	Context	Key Finding	Conclusion
Trust - general	Mayer et al, 1995	Ac	Defines organisational trust as: "The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party."	Definition	Organisational	Trust is a willingness (intention) to be vulnerable (risk) without the ability to monitor or control.	
Trust - general	Mayer, Davis & Schoorman, 1995	Ac	Trust does not involve risk itself, but is a willingness to engage in risk-taking with the trusted party.	Definition	Organisational	Trust is a willingness (intention) to engage in risk-taking.	
Trust - general	Yousafzai et al (2003)	Ac	SEE THIS ARTICLE FOR SUMMARY OF DEFINITIONS OF TRUST ONLINE				
Trust - general	Gambetta, 1988	Ac	"trust (or, symmetrically, distrust) is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, both before he can monitor such action (or independently of his capacity ever to be able to monitor it) and in a context in which it affects his own action"	Definition	General	Trust is a belief regarding the probability another actor will deliver as expected in a risk situation.	
Trust - general	Das & Teng, 1998:474	Ac	Trust is "the degree to which the trustor hold a positive attitude toward the trustee's goodwill and reliability in a risky exchange situation"	Definition		Trust is an attitude/belief regarding the trustee benevolence and competence.	
Trust - general	Oxford English Dictionary, 2000	Ac	Trust defined as "a firm belief in the reliability, truth or strength etc. of a person or thing"	Definition	General	Trust is a belief of benevolence on the part of another.	
Trust - general	Rousseau, Sitkin, Burt & Camerer, 1998	Ac	define trust as "Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another"	Definition	General	Trust is a state (belief), resulting in willingness to be vulnerable (intention).	
Trust - general	Whitener et al, 1998	Ac	ITO trust definitions, three themes are common (1) expectation of benevolent behaviour (2) risk (3) interdependance	Definition	General	Trust involves risk, interdependance and expectation of benevolent behaviour	
Trust - general	Ennew & Sekhon, 2007	Ac	Key themes that emerge in relation to the concept of trust (1) existence of risk (2) interdependance need (3) risk and interdep = vulnerability (4) involves confident expectations about future behaviours	Definition	Financial Services	Trust involves risk, interdependance, (therefore vulnerability) and and confident expectations.	
Trust - general	Guardian & ICM, 2013	Prac	In a survey of UK residents - when asked "which words best describe your idea of trust" 79% honesy, 69% truthfulness, 50% reliability	Definition	General	UK consumers see honesty as key to trust - integrity?	

From Gradcoach: https://www.youtube.com/watch?v=lw8HPXJP1VA, 18:58

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

42

Processing the Literature

- Reading and summarzing sources is not sufficient.

- Data contained in the sources must be processed into information that can serve as a foundation upon which new research can be built

- Can be compared to levels of learning about a topic – getting more and more familiar with a domain (e.g. Boom's Taxonomy)

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

44

■ Processing the literature is comparable to move upwards in Blooms Taxonomy)

6. Evaluate

5. Synthesise

4. Analyze

3. Apply

2. Comprehend

1. Know

create — Produce new or original work
Design, assemble, construct, conjecture, develop, formulate, author, investigate

evaluate — Justify a stand or decision
appraise, argue, defend, judge, select, support, value, critique, weigh

analyze — Draw connections among ideas
differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

apply — Use information in new situations
execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch

understand — Explain ideas or concepts
classify, describe, discuss, explain, identify, locate, recognize, report, select, translate

remember — Recall facts and basic concepts
define, duplicate, list, memorize, repeat, state

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

45

1. Know
2. Comprehend
3. Apply
4. Analyze
5. Synthesize
6. Evaluate

Knowledge the Literature

The researcher must demonstrate that he or she has read the article and extracted meaningful information from it

No knowledge-level Mastery:

Reader doesn't come to know anything about what the references say

Other research also indicates that individual and group marks should be combined in-group activities (Buchy & Quinlan, 2000; Lim et al., 2003; Romano & Nunamaker, 1998).

Knowledge-level Mastery:

This mentions research method and a conclusion

Buchy and Quinlan (2000) interviewed 36 students participating in tutorial groups. These interviews indicated that the students felt they were becoming more conscious of learning processes of both themselves and their peers.

1. Know
2. Comprehend
3. Apply
4. Analyze
5. Synthesize
6. Evaluate

Comprehend the Literature

The researcher demonstrates that he or she not only can repeat what was included in the article but also knows the meaning and significance of the information.

Pre-comprehension level mastery:

> *Does not go beyond a set of "buzz-words"*

> Han and Kamber (2001) suggest an evolution that moves from data collection and database creation, towards data management, and ultimately, data analysis and understanding.

Comprehension-level mastery:

> *demonstrates an understanding of the concepts presented by the source*

> Han and Kamber (2001) suggest an evolution that moves from data collection and database creation, towards data management, and ultimately, data analysis and understanding. For example, *data processing* is a base function enabling manipulation and aggregation of data, thus facilitating searching and retrieval.

1. Know
2. Comprehend
3. Apply
4. Analyze
5. Synthesize
6. Evaluate

Apply the Literature

Application of literature can be revealed by the two-step process:

    a) identifying the major concepts germane to the study and

    b) placing the citation in the correct category.

Application-level mastery:

	Concept 1	Concept 2	…	Concept n
Article 1	X			X
Article 2		X		
…			X	X
Article n		X	X	

1. Know
2. Comprehend
3. Apply
4. Analyze
5. Synthesize
6. Evaluate

Analyze the Literature

Analysis entails identifying why the information being presented is of importance.

Knowledge without analysis:

Just present the facts

Data mining is a process of discovering new knowledge by using statistical analysis to identify previously unsuspected patterns and clustering in large data sets (Chen & Liu, 2005).

Analysis-level mastery:

insight into why it would be of any interest or value to find patterns and relationships in order to make correlations

Data mining is the analyzing and interpretation of large amounts of information. Through analyzing vast amounts of data it is possible to find patterns, relationships and from these discoveries it is possible to make correlations (Chen & Liu, 2005).

1. Know
2. Comprehend
3. Apply
4. Analyze
5. Synthesize
6. Evaluate

Synthesize the Literature

Assemble the literature being reviewed for a given concept into a whole that exceeds the sum of its parts

Lack of Synthesis:

Listing of findings

The *Digital Object Identifier (DOI)* is an Internet-based system for global identification and reuse of digital content (Paskin, 2003). It provides a tracking mechanism to identify digital assets (Dalziel, 2004). The DOI is not widely employed across LOR and databases and is not universally adapted by content owners (Nair & Jeevan, 2004). The DOI does not provide provision for assets to be tagged with copyright information (Genoni, 2004).

Synthesis-level mastery:

research from a number of sources is very effectively woven together

One current DRM initiative, the *Digital Object Identifier (DOI)*, is an Internet-based system for global identification and reuse of digital content, and provides a tracking mechanism to identify digital assets (Paskin, 2003; Dalziel, 2004). However, despite being integrated in learning object technologies, this DOI is not widely employed across LOR and databases, nor is it universally adapted by content owners (Nair & Jeevan, 2004). Similarly, while most metadata schema enables assets to be tagged with copyright information, this method lacks technological enforcement (Genoni, 2004).

1. Know
2. Comprehend
3. Apply
4. Analyze
5. Synthesize
6. Evaluate

Evaluate the Literature

Clearly distinguish among opinions, theories, and empirically established facts.

Non-evaluated citations:

> no indication if the material from the literature has been evaluated in any way

Data mining has applicability to education as well as business (Sanjeev, 2002; Ma et al., 2000; Glance et al., 2005; Abe et al., 2004; Liu et al, 2005).

Citations demonstrating evaluation:

> clearly identifies the type of information being presented – case study reports in the first four, opinion in the fifth citation

… the applications of data mining fall under the general umbrella of business intelli-gence. Case studies have reported implementation of data mining applications for: (1) Enrollment management (to help capture promising students) (Sanjeev, 2002); (2) Alumni management (to foster donations and pledges) (Ma et al., 2000); (3) Marketing analysis (to better allocate the marketing funds) (Glance et al., 2005); and (4) Mail campaign analysis (to judge its effective-ness and design new, better targeted mailings) (Abe et al., 2004). Based upon the similarity to applications within the business community, Liu et al (2005) speculated that data mining could also be used within the educational community for fraud analysis and detection.
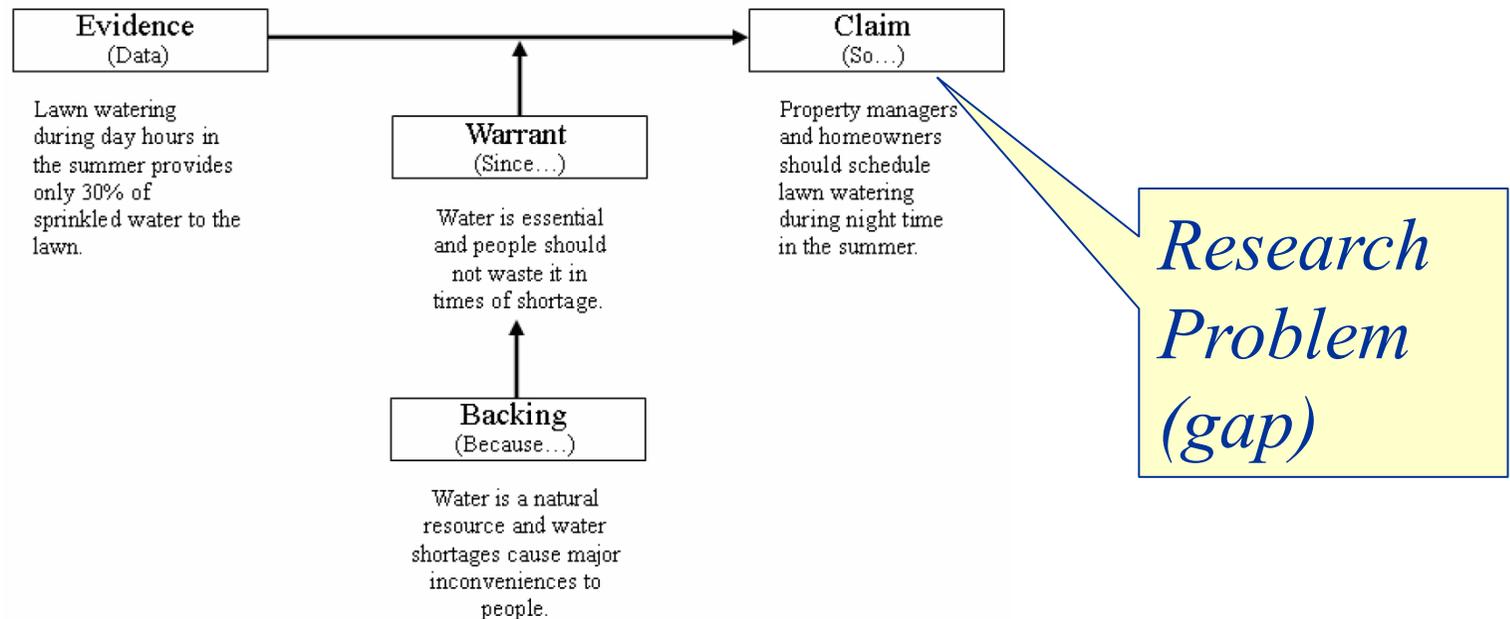
Evidence

↓

Warrent

↓

Claim

3. Output: Writing the Literature Review

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

52

Literature Review

- The "literature review […] must be *clear*, have a *logical structure* and show that you have *acquired a sufficient range of skills* and capabilities" (p. 172).

- A literature reviews is an argumentation for the research problem.

Evidence (Data)		Claim (So…)
Lawn watering during day hours in the summer provides only 30% of sprinkled water to the lawn.	**Warrant** (Since…) Water is essential and people should not waste it in times of shortage.	Property managers and homeowners should schedule lawn watering during night time in the summer.
	Backing (Because…) Water is a natural resource and water shortages cause major inconveniences to people.	

Research Problem (gap)

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

53

Literature Review – Show Significance and Originality

- The "literature review […] must be *clear*, have a *logical structure* and show that you have *acquired a sufficient range of skills* and capabilities" (p. 172).

- A literature reviews is an argumentation for the research problem.
  - ◆ After the reader has read your literature review, there must be no doubt that your work has some significance.
  - ◆ Show your significance by constantly indicating what the gap is in the existing literature.
    - ● *"While contributing … (XYZ, 2018) does not address [your originality]"*
    - ● *"However, he does not consider the problem in the context of … [while you do]. "*

- If you have identified gaps and your work addresses these gaps, it is obvious that your work is original.

Selecting Works to include
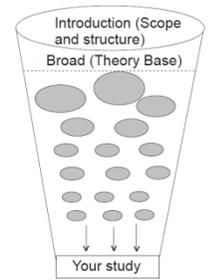
- How many works in a literature review?

- There is no golden number.

- Important – include newer references!

- Stay away from too many general works – especially text books.

- Don't get carried away for pages and pages on irrelevant work.

- Look at your thesis statement: how does the work relate to this?

- References should support your arguments!

- Limit your literature review at the end if it is too comprehensive in the beginning.

Thanks to Prof. Alta van der Merwe

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

55

Writing up the Literature Review

- Outline your chapter (thematically)

- First draft: Getting it all onto your paper
    - ♦ Don't aim for perfection

Done is better than perfect.
Sheryl Sandberg

- Second draft: tightening up and improving flow

- Ask someone for feedback (read and explain back)

Fitting the literature into your research

- An effective and quality literature review is based upon a ***concept-centric*** approach rather than chronological or author-centric approach

A & B (1998) introduced X. Another approach is the Y method: C et al. (1999) discuss how ... can be achieved through... In (D 2002), the Z is mentioned, which takes a perspective similar to (A & B 1998)... Finally, (E & F 1999) have to be mentioned, who further develop the approach of (C 1999)...

Better would be:

For the task of TT, two approaches can be distinguished

Anything wrong with this?

- using X/Z, as discussed by (A & B 1998; D 2002)

- following the Y method as suggested by (C et al. 1999) and further developed by (E & F 2004)

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

57

Criteria for a sound argument

Structure	use a reliable structure that is explicit following proper argumentation.
Definition	define the terms you will use carefully with clear examples and backed by quality peer-reviewed sources.
Reasons	provide reason for everything you have included as support.
Assumptions	substantiate your assumptions; do not leave them as implicit. Use only reliable assumptions that are free of subjective judgment and are based on valid reasoning.
Fallacies	avoid fallacies, such as generalization, abstraction and misplaced concreteness.
Evidence	use only reliable documented evidence from quality peer-review sources that is legitimate and relevant, not trivial.

Adopted from (Hart 1998)

Prof. Dr. Knut Hinkelmann
knut.hinkelmann@fhnw.ch

Literature Review

58

Introduction/Conclusion
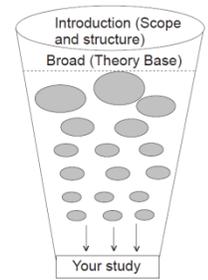
■ Write your introduction of your literature review lastly. You then know the order of the works that you will address and can give a better overview of what the reader should expect.

■ Give a summary of the state of the scholarship as it pertains to your thesis in the conclusion. Note the preference of the word conclusion / summary at the end of a chapter.

Thanks to Prof. Alta van der Merwe