Design *Thinking:* Ideation

Literature Research

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What is Literature Research?

- Effective evaluation of selected documents on a research topic
- To gather information & to derive knowledge

The focused search for information in printed & digital, scientific & non-scientific literature.

What are the goals?

- Answering scientific research questions
- Investigating the relevance of a research question
- Familiarization with the scientific field and the state-of-the-art
- Identifying relevant, yet to be answered problems
- Formulating new scientific question, identifying omitted topics

http://sdqweb.ipd.kit.edu/wiki/Literaturrecherche

What is the result?

- Understanding of solution approaches considering same or similar questions and their potential weaknesses
- Categorization or classification of current solution approaches
- Knowledge about the key conferences, journals, and workshops in the respective field of expertise
- Knowledge about the most important individuals within the field of expertise

What are typical mistakes? 1/3

- Unreflecting Search on the Web
  - Search terms are often not eligible
  - Search Engines might not sort results according to scientific relevance
  - No real knowledge about the field
  - Using only one search engine
  - No systematic variations of search terms
- Insufficient consideration of fundamental literature
  - Consult your advisor

What are typical mistakes? 2/3

- Giving up too early
  - If there are no related solution approaches to be found
  - Questioning the relevance of the scientific research question
  - Abstracting from the current problem field to works of another domains or contexts
- Naive Depth-First Search
  - Depth-First Search = recursive processing of reference sources
  - Exponential increase of the number of papers to read

What are typical mistakes? 3/3

- Usage of insufficient sources
  - Wikipedia: Entries can be edited by everyone and can be erroneous
- Subsequent literature research
  - Instead of prior to the work done

What is the right method?

„There is no single right method or the best way to search, examine and choose text or image material, but different approaches.“
(http://www.studium.uni-oldenburg.de/download/lernwerkstatt/Kunst_und_Medien_LitBildRecherche1.pdf)

Suitable approaches depend on

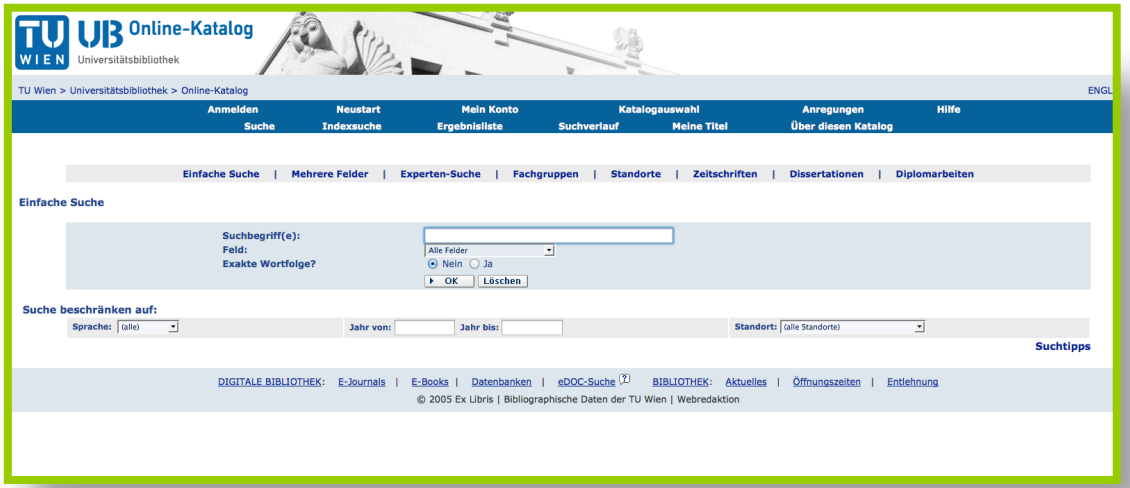
- The topic of choice
- The initial research problem/question
- Own prior knowledge
- Research opportunities (e.g., library stock)

Wikipedia.org?

- Good for orientation
- No further utilization as information was not reviewed by scientific editors

How does literature research take shape?1/4

Systematic search of library catalogues; Focused search of all works extracted by, e.g., search term



How does literature research take shape? 2/4

Snow-Ball System

- Search for current sources regarding the topic (book, paper)
  ➔ Check literature (references, footnotes)
- Pros: fast, good overview
- Cons: often dated references

How does literature research take shape? 3/4

„Grab one off the shelf“ at the library

- Entry point for literature research if the topic is still vague
- Pros: Orientation, relevant sources identifiable
- Cons: selection may not be representative (stock, borrowed books, etc.)

How does literature research take shape?4/4

Internet search

- Search engines (e.g., Google), library catalogue, online shops (e.g., Amazon)
- Pros: fast and current findings
- Cons: quality may be questionable

How to do it?

(I) Prepare
    What do I have to know beforehand?
(II) (Re-)Search
    What do I have to consider while searching?
(III) Choice and Evaluation
    How do I verify what I have found?
(IV) Acquisition of the literature
    How do I actually get the literature I have found?
(V) Documentation
    How do I document results?

http://blog.hslu.ch/bibliothek/files/2009/05/skript-literaturrecherche.pdf

(I) Preperation 1/3

- Put up a deadline for finalizing the search
- Define a precise, not too wide problem/question space
- Choose search terms, synonyms, and translations
  - Describe the topic precisely, structure it into smaller parts
  - Fitting umbrella terms and minor terms (related and synonymous terms)
  - Check different lexica, handbooks, primers and textbooks
  - Check for English translations

(I) Preperation 2/3

- Define the type and scope of the literature
  - Amount (5-10 good references, as complete as possible)
  - Types of literature
    - Course Literature (primers)
    - Scientific Books (foundations)
    - Journal articles (foundations)
    - Editorials/Proceedings/Festschriften
    - Dictionaries
    - Proceedings and Working Papers, Congress reports (State of the art, no external validation)
    - Additional Information: Newspaper articles, statistics, year books, catalogues, press releases, governmental information

(I) Preperation 3/3

- Choose sources of information
  - Depends on the type and amount of literature aimed for
  - Library catalogue
    search for books and self-published documents (academic texts, congress proceedings, journal articles)
  - Databases / full text e-journals
    search for conference proceedings, journal articles
    Types of databases:
    - Literature databases (independent and „published“ Literature)
    - Fact databases (statistics, lexica, dictionaries)
    - Full text databases (journal and news articles)

(II) (Re-) Search 1/2

- Search: results in findings
- Browse: results in register/index
- Tags: search across fields
- Key-words: nominated terms, tagged by people → Keyword Index
- Thesaurus: shows semantic relationships between key-words
- *Tip:* tag-search across many fields results in a huge number of findings → check for most important titles → find relevant key-words for research in the specific field

(II) (Re-) Search 2/2

- Connect search-terms (bool-operators): AND, OR, NOT
- Phrase-search: search for specific strings of chars/words
  Truncation/Wildcards: to expand the search, (e.g.: *, ?, ! and $...)
- Snow-Ball System
  - Research and evaluation of the findings in parallel instead of sequential order
  - Search for current publications > search citations and references for more important, foundational works in the field
  - Cancel the search, if the amount of NEW materials is getting low

(III) Choice & Evaluation 1/3

- Choices are made using
  - Bibliographical Information
    (Title, Authors, Year, Edition, Publisher)
  - Abstract
  - Electronic Bookshops (e.g., Amazon)
    - Additional Information (Synopsis, Introduction, Table of Contents, Discussions)

(III) Choice & Evaluation 2/3

- If there was not enough literature found …
  - Were key-words used correctly?
  - Are there more index-terms to be found, qualifying as search terms?
  - Which search-terms were successful until now?
  - Does it make sense to use truncations/wildcards?
  - Were all relevant literature sources included?
  - Are there more specific databases, e.g., other university libraries?
  - Was the Snow-Ball system applied?

(III) Choice & Evaluation 3/3

- If there was too much literature found …
  - Which titles can be excluded content-wise (periphery of the topic, no new information to be found)?
  - Narrow down scope of the topic further (AND-Operator)
  - Are the authors found renown in the field? Have the authors found published much within the field?
  - Were the articles published in renown venues/journals?
  - Are the papers of high quality and are the contributions within in-depth?

(IV) Acquisition of the literature

- Depending on the type of literature, e.g., buying, downloading, borrowing, …

(V) Documentation

- Archive
- Print
- E-Mail
- Use a literature-reference system
  - JabRef (http://jabref.sourceforge.net/)
  - citeulike (http://www.citeulike.org/)
  - Zotero (http://www.zotero.org/)
  - Citavi (http://www.citavi.com/)
  - RefWorks (http://www.refworks.com/)
  - EndNote (http://www.endnote.com/)
- note used tags/key-words

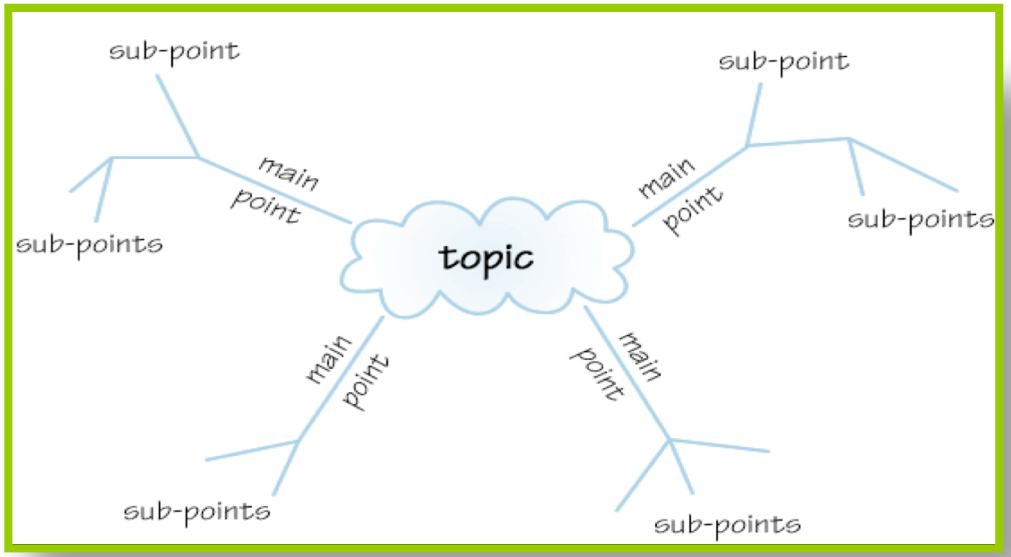
(V) Documentation

- (Re-)Search strategy (Text Search, Term Search, Bool-operators) in documented literature databases
- The used filters
- Number of entries, data, and search variables
- Reasons how and why found results were excluded

How to structure the found data?

Identify connected and contradicting statements, theories, studies, …

Create Mind-maps



How to structure the found data?

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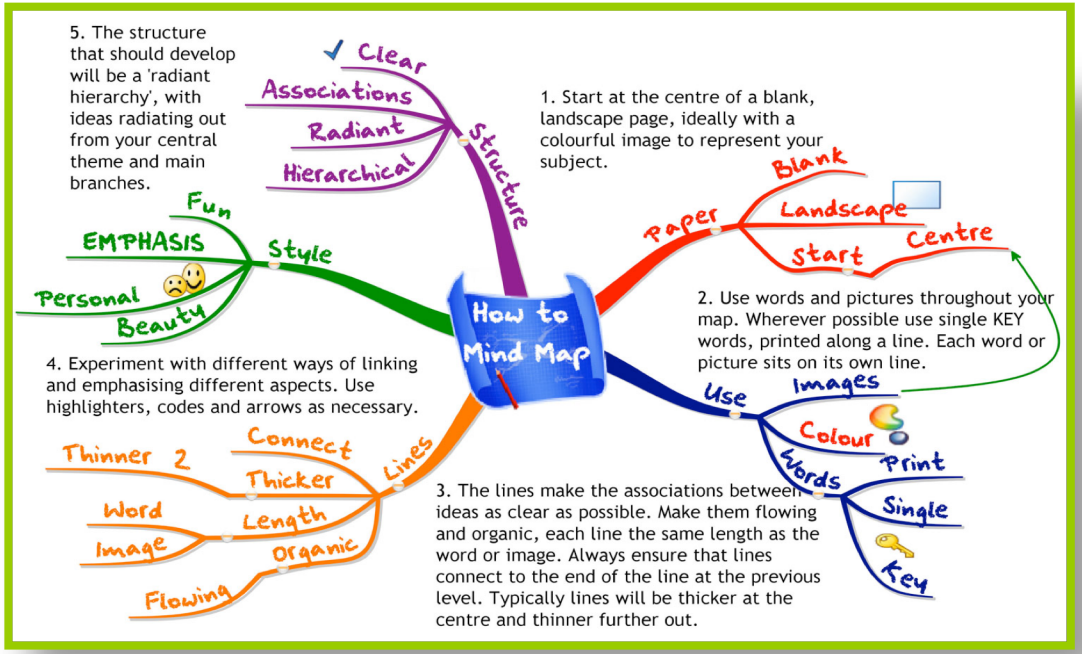

How to structure the found data?

Explain, discuss, and question different aspects of your topic of choice

… Use it in the context of various scientific research endeavors

HA1 – Literature Research

Undertake Literature Research regarding the topic according to the mentioned steps :

- Prepare, (Re-)Search, Choice and Evaluation, Acquisition of the literature, Documentation
- At least 5 scientific literature references per team-member
- 3-5 pages summary per team member
- Use each reference only once within your group
- Max. 20% quotes and images
- Hand in ONE file, including all team-member's documents (.zip)