WORKING WITH SCIENTIFIC LITERATURE

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Related Works

Background

Conducting Systematic Literature Review

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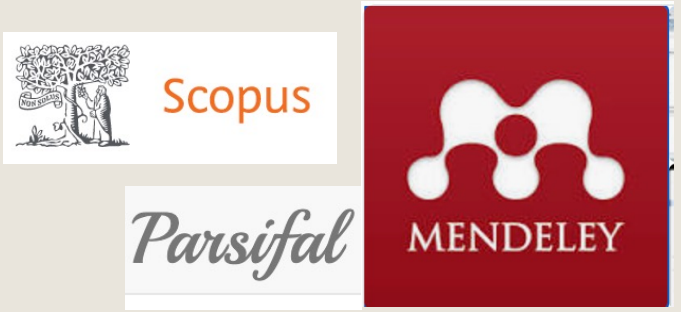
LITERATURE REVIEW

1. **Preliminary study:**
   - Is conducted ***before starting a project:*** provides motivation / justification for the study; used in the Introduction
   - To identify a gap in the existing research and to find a relevant research problem (e.g. for your thesis)
2. **State of the Art:**
   - Is conducted ***at the beginning*** of any research project
   - To explore some domain and to understand the existing trends, topics, challenges
3. ***Background***
   - Is conducted ***along*** the research project; used as a specific chapter
   - In order to explain all the main terms, concepts and underlying assumptions required to understand your research
4. ***Related work***
   - Is conducted ***along*** the project; finalised ***by the end*** of the project; used as a specific chapter or part of the background
   - In order to position your research next to the existing research and justify its added value

See also: https://www.youtube.com/watch?v=hMGdwIhiwzU

TOOLS



- **Searching for Articles:**
  - **Search engines:**
    - Google Scholar
    - MIAGE Scholar (https://scholar.miage.dev/)
  - **Scientific DB:**
    - ResearchGate, Academia, HAL
  - **Scientific publishers**
    - Springer, Elsiever, IEEE, Mdpi, …
  - **Other reference DB:**
    - Scopus
  - **Dark net ;)**
    - Sci-hub
  - AI? LLM? ChatGPT?

- **Organising/Managing the bibliography**
  - Mendeley desktop
  - Excel
  - Latex / Overleaf → bibtex
- **Analysis, Data extraction**
  - Excel
  - Parsifal (https://parsif.al/) - an online tool designed to support researchers to perform systematic literature reviews within the context of Software Engineering.
  - OpenAI : Dimensions; Research Paper Analyser.

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- **Scientific publishing:** Springer, ACM, IEEE, etc
- **Peer review** is the evaluation of work by one or more people with similar competencies as the producers of the work (peers) /Wikipedia/
  - Conflict of interests
- **Open-access journals**
- **Sci-hub**
- **Zlibrary**
- **scite**

ORGANISE YOUR LITERATURE REVIEW

https://scholar.miage.dev/

- Type your query by following the doc e.g. *TITLE-ABS-KEY(blockchain) AND TITLE-ABS-KEY(INDUSTRY 4.0) AND (TITLE-ABS-KEY(Security) OR TITLE-ABS-KEY(Privacy))*
- Click "count results" to get the number of results
- Once you have a number, click Fetch to resolve DOIs
- Once the resolving is done, a button allows you to download a bibtex file
- import it in mendeley Desktop
- Select all the (yet untitled) entries and right click > update details
- Wait for mendeley to populate each entry
- In mendeley, select all entires and export as a bib file
- Import your results in parsif.al

HOW TO USE LITERATURE AND FIND A PROBLEM/RQ FOR YOUR RESEARCH PROJECT?

1. Choose a **broad topic of your interest**
   - Example: "cyber security", "cloud computing", "IoT", "blockchain" …
2. Find and Read several **Literature reviews** on this topic
   - Search for **scientific, peer-reviewed secondary studies**
   - TIP: a quality review normally has 10+ pages and 25+ rederences
3. Search for **a gap/a problem** which you like to solve/explore
   - Check out the **existing problems / solutions** reported in the paper
   - Check out the **open questions/unresolved issues**
4. Write your own research question…

About preliminary literature review and identifying a gap, see also: https://www.youtube.com/watch?v=hMGdwIhiwzU

EXERCISE 1: FINDING A RQ

- Choose **a broad topic**
- Make a literature search (Ex: @Miage Scholar)
  - Document your search string!
- Choose ONE secondary study which is..
  - recent
  - scientific
  - relevant
- Read the study, identify the gaps/open questions presented in it
- **Write down two (or more) research questions that can be adressed in a master thesis**

EXERCISE 2: IMPROVE YOUR RQ

- Watch the video on Scribbr: https://www.youtube.com/watch?v=71-GucBaM8U&list=PLjBMY3HggCpAjmtPByI_MkFI6lrguHatL&index=2
- Check your RQ from the previous exercise. Is it good according to the presented criteria?
  - If not entirely, why?
- Reformulate your question(s) if needed to meet the quality criteria (i.e., complexity, specificy, relevance)
- Are there hidden assumptions about studied phenomena / context when this phenomena can be observed?
  - If yes – explain how you are going to address them.
- Are there any ambigous terms?
  - If yes – specify them

EXERCISE 3: HYPOTHESIS

- What kind is your research question?
  - Descriptive? Existence? Comparison? Explanatory? Other?..
- Make some **hypotheses** related to your research question
  - What do you expect to observe?
  - What are your assumption about the phenomenon you study?
  - What is your Null hypothesis?

STEPS IN CONDUCTING A RESEARCH PROJECT

1. Identification of a practical problem – Motivation*; (optional)*
2. Identification of a research problem
3. Literature review
4. Determining specific research questions
   - Specification of a conceptual framework, (including a set of hypotheses)
5. **Choice of a research methodology**
   - Data collection
   - Verifying data
   - Analysing and interpreting the data
6. Reporting and evaluating research
7. Communicating the research findings and, possibly, recommendations

CHOOSE YOUR METHOD

- Research strategy
  - Data collection
  - Data analysis