How to do a **systematic literature review**?


How to do **systematic mapping studies**?

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How to do **systematic mapping studies**?


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**Systematic Literature Review**

1. Specify Research Questions
2. Develop Review Protocol
3. Validate Review Protocol
4. Identify Relevant Research
5. Select Primary Studies
6. Assess Study Quality
7. Extract Required Data
8. Synthesise Data
9. Write Review Report
10. Validate Report
1. Specify Research Question

- **Effect** of a software engineering technology
- **Frequency or rate** of a project development factor
  - (adoption of a technology, frequency or rate of project success or failure)
- **Cost and risk factors** associated with a technology
- Impact of technologies
  - reliability, performance and cost models
- **Cost / benefit** analysis of employing specific software development technologies or software applications
1. Specify Research Question

- Effect of a software engineering technology
- Frequency or rate of a project development factor – (adoption of a technology, frequency or rate of project success or failure)
- Cost and risk factors associated with a technology
- Impact of technologies – reliability, performance and cost models
- Cost/benefit analysis of employing specific software development technologies or software applications

What evidence is there that cross-company estimation models are not significantly different from within-company estimation models for predicting effort for software/Web projects?

Which experimental procedure is most appropriate for studies comparing within- and cross-company estimation models?

2. Developing Review Protocol

- Background
- The research questions
- The strategy that will be used to search for primary studies including search terms and resources to be searched
- Study selection criteria
- Study selection procedures
- Study quality assessment checklists and procedures
- Data extraction strategy
- Synthesis of the extracted data
- Dissemination strategy
- Project timetable
3. Evaluating a Review Protocol

• If appropriate funding is available
  – a group of independent experts should be asked to review the protocol
  – same experts can later be asked to review the final report.

• Students should present their protocol to their supervisors for review and criticism

Systematic Literature Review

Phase 1: Plan Review

Phase 2: Conduct Review

Phase 3: Document Review

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7. Extract Required Data
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4. Identify Relevant Research

- Find as many primary studies relating to the research question as possible using an unbiased search strategy

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Software Engineering Digital Libraries

- IEEEExplore
- ACM Digital library
- SpringerLink
- Google scholar (scholar.google.com)
- Citeseer library (citeseer.ist.psu.edu)
- Inspec (www.iee.org/Publish/INSPEC/)
- ScienceDirect (www.sciencedirect.com)
- EI Compendex (www.engineeringvillage2.org/Controller/Servlet/AthensService)
5. Select Primary Studies

• **Study selection criteria** are intended to identify those primary studies that provide direct evidence about the research question
  – selection criteria should be decided during the protocol definition, although they may be refined during the search process

6. Assess study quality

• Still more detailed inclusion/exclusion criteria

• Investigate whether quality differences provide an explanation for differences in study results

• As a means of weighting the importance of individual studies when results are being synthesised

• To guide the interpretation of findings and determine the strength of inferences

• To guide recommendations for further research
6. Assess study quality

- Still more detailed inclusion/exclusion criteria
- Investigate whether quality differences provide an explanation for differences in study results
- As a means of weighting the importance of individual studies when results are being synthesised
- To guide the interpretation of findings and determine the strength of inferences
- To guide recommendations for further research

- Checklists of factors that need to be evaluated for each study
  - Quantitative and qualitative studies

7. Extract required data

- Design data extraction forms to accurately record the information researchers obtain from the primary studies
  - Linked to the research questions
8. Synthesise data

- Collating and summarising the results of the included primary studies
  - Descriptive (non-quantitative)
  - Quantitative
- The data synthesis activities should be specified in the review protocol
  - However, some issues cannot be resolved until the data is actually analysed
9. Write review report

• Specifying the dissemination strategy
  – Journal, conference paper, technical report,
• Formatting the main systematic review report
  – in a section of a thesis

10. Validate report

• Journal articles will be peer reviewed as a matter of course

• Experts review theses as part of the examination process

• Technical reports are not usually subjected to any independent evaluation
In your thesis work

At least 5-7 articles