Systematic Literature Review & Mapping

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Outline

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• Goals
• Planning the SLR & Mapping
• Methodology
• SLR & Mapping, step by step
• Where to publish a Literature Review
• Conclusions
• Acknowledgments
• References
Introduction
What is a SLR & Mapping?
Introduction. What is a SLR & Mapping

The SLR is a type of literature review that collects and critically analyzes multiple research studies or papers through a systematic process.

The purpose of a SLR is to provide an exhaustive summary of the available literature relevant to a research question.
Introduction. What is a SLR & Mapping

The SLR born in the field of Medicine and Health studies to get expertise in a topic.

In Healthcare, exists the Cochrane Collaboration group composed by more than 31000 members that work reviewing systematically research related to prevention, treatments, rehabilitation and health systems intervention.

This group publish their reviews in the Cochrane Database of Systematic Reviews which has an impact factor of 6.103 and is ranked 12th in the “Medicine, General & Internal” in JCR (top 7%).
Introduction. What is a SLR & Mapping

The SLR is not currently restricted to Healthcare. There are many researchers and organization involved in making SLR in other knowledge fields.

I.E. the Campbell Collaboration is a sister initiative of Cochrane Collaboration that deals with SLR in Social Sciences.

Also in other fields like Computer Sciences there is a strong community that works with SLR and tries to standardize it and spread its techniques and results in the knowledge area.
The Mapping in Literature Reviews (a.k.a. Literature Mapping) techniques are useful at the very beginning of the literature review as a brainstorming and scoping tool\(^1\).

The literature mapping is broadly used to complement the SLR

\(^1\) [https://as.exeter.ac.uk/media/universityofexeter/academicservices/educationenhancement/cascade/Mapping_in_literature_reviews.pdf](https://as.exeter.ac.uk/media/universityofexeter/academicservices/educationenhancement/cascade/Mapping_in_literature_reviews.pdf)
Introduction. What is a SLR & Mapping

The Mapping Literature techniques/outcomes are very different depending on the purpose:

- To write down words, phrases and sub-topics related to the main topic in a white paper to gather key concepts and issues
- Summarize key findings from journal, books and working papers to create concept maps
- Present a summary of the journals, conferences, publication years, most important authors, etc. found in the SLR
- Etc.
Introduction. What is a SLR & Mapping

Systematic Literature Review ≠ Mapping in Literature Reviews
Introduction. What is a SLR & Mapping

Systematic Literature Review + Mapping in Literature Reviews = Better results
Goals
Goals

- Deeper knowledge in your knowledge field
- Get insight about the current trends and future challenges
- Identify the most important authors
- Identify the most important journals & conferences
- Get a (several?) good publication(s)
- Get citations
Planning the SLR & Mapping
Planning the SLR & Mapping

Several aspects to keep in mind:

• Scope
• Time
• Planned revenue
• Where to publish
Methodology
Methodology

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https://commons.wikimedia.org/w/index.php?curid=49168037
Methodology

• Define research questions (and goals)
• Define inclusion criteria for your SLR
• Define exclusion criteria for your SLR
• Search in scientific databases and extract relevant contents/data (iterating the process in several stages).
• Assess the quality of these results
• Gather the most outstanding results in order to analyze, discuss and learn from them.
SLR & Mapping, step by step
SLR & Mapping, step by step

1. RQs
2. ICs
3. ECs
4. PICOC
5. Databases
6. Queries
7. Review phases
8. Quality assessment
9. Traceability
10. Write results
SLR & Mapping, step by step

Research Questions
Research questions: Mapping

MQ1: How many studies were published over the years?
MQ2: Who are the most active authors in the area?
MQ3: Which publication vehicles are the main targets for research production in the area?
MQ4: In which domains has pragmatic interoperability been applied? (e.g. Bioinformatics, Telemedicine, Business)
MQ5: Which type of computational support has pragmatic interoperability techniques provided (e.g. framework, software architecture, etc.)?
MQ6: Which definitions of pragmatic interoperability have been used?
SLR & Mapping, step by step

Research questions: SLR

RQ1: Which solutions have been used to enhance pragmatic interoperability?
RQ2: How did the proposed solutions address pragmatic interoperability?
SLR & Mapping, step by step

PICOC
SLR & Mapping, step by step

PICOC: defining the SRL scope. This scope helps in the papers analysis to answer the research questions

- Population (P)
- Intervention (I)
- Comparison (C)
- Outcomes (O)
- Context (C)
SLR & Mapping, step by step

PICOC

Population (P): Solutions that implement interoperability.
Intervention (I): Pragmatic interoperability solution.
Comparison (C): No comparison intervention.
Outcomes (O): Solution.
Context (C): Computational solutions.
Inclusion Criteria
Inclusion Criteria

IC1: The papers proposed a pragmatic interoperability solution (method, technique, model, tool, framework) AND
IC2: The proposed solution are applied on software OR system OR application OR service OR infrastructure AND
IC3: The proposed solution supports machine to machine pragmatic interoperability AND
IC4: The papers are written in English language AND
IC5: The papers are reported in peer reviewed Workshop or Conference or Journal or Technical Reports.
Exclusion Criteria
Exclusion Criteria

EC1: The papers do not propose a pragmatic interoperability solution OR
EC2: The proposed solution are not applied on software OR system OR application OR service OR infrastructure OR
EC3: The proposed solution does not support machine to machine pragmatic interoperability OR
EC4: The papers are not described in English OR
EC4: The papers are not published in a peer reviewed conference or journal
SLR & Mapping, step by step

Databases
SLR & Mapping, step by step

Databases:

WoS, Scopus, Google Scholar, IEEEXplore, ACM, Springer, ERIC, Pubmed, ScienceDirect, Compendex, etc.

**Not limited only to major databases.**
SLR & Mapping, step by step

Queries
SLR & Mapping, step by step

The queries between the different database where the researcher search for results should be the same or equivalent

(if not, the results gathered would not be comparable)
SLR & Mapping, step by step

Review phases
SLR & Mapping, step by step

Review phases. Typical steps:

1. Execute query
2. Remove duplicates
3. Review by regarding titles and abstracts (applying IC, EC)
4. Review the full text & assess quality (applying also IC, EC)
5. Include (if necessary) papers cited in your results and repeat
SLR & Mapping, step by step

Review phases

- **Step 1**: Execute the defined query string in the selected database
  - n=2542
  - Remove duplicated studies
  - n=1691

- **Step 2**: Reviewed by reading title and abstracts
  - n=49

- **Step 3**: Reviewed by reading the full text
  - n=13
SLR & Mapping, step by step

Quality assessment
SLR & Mapping, step by step

Quality assessment: checklist

• The researcher would assess quality using a checklist to evaluate the aspects relevant for the SLR in each paper

• Depending on the evaluation score, each paper would be included or excluded in the final phase. The researcher will fix the cutoff point.
## Quality assessment: checklist

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are the research aims clearly specified?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>2. Was the study designed to achieve these aims?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>3. Are the used techniques clearly described and their selection justified?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>4. Are the variables considered by the study suitably measured?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>5. Are the data collection methods adequately described?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>6. Is the data collected adequately described?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>7. Is the purpose of the data analysis clear?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>8. Are statistical techniques used to analyse data adequately described and their use justified?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>9. Are negative results (if any) presented?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>10. Do the researchers discuss any problems with the validity/reliability of their results?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>11. Are all research questions answered adequately?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>12. How clear are the links between data, interpretation and conclusions?</td>
<td>Y/N/partial</td>
</tr>
<tr>
<td>13. Are the findings based on multiple projects?</td>
<td>Y/N/partial</td>
</tr>
</tbody>
</table>
SLR & Mapping, step by step

Traceability
SLR & Mapping, step by step

Traceability

• You must provide full explanations on how was carried the process
• You should include the papers reviewed in each phase. Depending the review phase you will required to specify the IC, EC used to select or reject the paper in the SLR.

• If you do not provide these explanations, the reviewer/thesis supervisor will not be able to trust your research (and you).
SLR & Mapping, step by step

Traceability

• Most of these information cannot be included in a journal/conference paper.

• Too much extension / visual fatigue (in the case of huge tables)
SLR & Mapping, step by step

Traceability

- One solution: use Google Spreadsheets
  - [https://docs.google.com/spreadsheets/d/169RtU7Q4Qq1eryq1d6c1XnMzDEhgyptYqZh1C8eaYA/edit#gid=0](https://docs.google.com/spreadsheets/d/169RtU7Q4Qq1eryq1d6c1XnMzDEhgyptYqZh1C8eaYA/edit#gid=0)

- Other solutions: use Websites
  - [https://sites.google.com/site/francilaneiva/research/pragmatic-interoperability-a-systematic-mapping](https://sites.google.com/site/francilaneiva/research/pragmatic-interoperability-a-systematic-mapping)
SLR & Mapping, step by step

Write results
SLR & Mapping, step by step

Write results:

• Usually the resultant paper will have one section for the mapping report and other for the systematic.

• Each one should respond the research questions and provide insights about the paper and contents selected for that.

• Use charts, tables and visual explanations.
SLR & Mapping, step by step

Write results.
SLR & Mapping, step by step

Write results.

<table>
<thead>
<tr>
<th>Authors’ names and number of publications.</th>
<th></th>
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<td><strong>Name</strong></td>
<td><strong>Total</strong></td>
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<td>Kecheng Liu</td>
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<td>James Geller, Yuyung Lee, Lea Kuvonen</td>
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<td>Zhongfu Wu, Boriana Rukanova, Lin Liang, Pieter De Leenheer, Goran D. Putnik, Gan Mingxin, Min Gao, Wenge Rong, Zlata Putnik, Robert A. Stegwee, Andreas Tolk, Soon Ae Chun, Jejung Lee, Lus Ferreira, Electra Tamani, Saikou Y. Diallo, Sanket Shah, Janne Metso, Chintan Patel, Kecheng Liu, Kees van Slooten, Paraskevas Evrpidou, Toni Ruokolainen, Stijn Christiaens, Maria Manuela Cruz-Cunha, Charles D. Turnitsa, Weizi Li, Shixiong Liu</td>
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SLR & Mapping, step by step

Write results.

<table>
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<th>Reference</th>
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<td>[23]</td>
<td>International Conference on Advanced Language Processing and Web Information Technology (ALPIT)</td>
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<td>IEEE Enterprise Distributed Object Computing Conference Workshops (EDOCW)</td>
<td>13</td>
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<tr>
<td>[24]</td>
<td>International Conference on e-Business Engineering (ICEBE)</td>
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<td>[25]</td>
<td>International Conference on Enterprise Information Systems (ICEIS)</td>
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<td>International Conference on the Pragmatic Web (ICPW) IEEE International Conference on Web Services (ICWS)</td>
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<td>International Journal of Enterprise Information Systems (IJEIS)</td>
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SLR & Mapping, step by step

Write results.

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<th>Software agents</th>
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SLR & Mapping, step by step

Write results.

<table>
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Table content:


Example data:

Where to publish a Literature Review & Mapping
Where to publish a Literature Review & Mapping

- Conferences
- Journals
- Books
Where to publish a Literature Review & Mapping: examples
Where to publish a Literature Review & Mapping

• TEEM Conference

• Other conferences (HCI International, Interacción, SIIE, AIDIPE?)

• PLOS ONE

• Education in the Knowledge Society (EKS)

• International Journal of Knowledge Management (IJKM).

• Health Education
Where to publish a Literature Review & Mapping

- International Journal of Law and Management
- International Journal of Productivity and Performance Management
- Computers in Human Behavior
- Information and Software Technology
- IEEE Transactions on Software Engineering
- Computers & Education
- ...

...
Conclusions
Conclusions

• Strengths

• This kind of reviews are regarded as the strongest in many knowledge areas

• Many organizations fund SLR processes for develop research

• A good SLR in a journal that accepts this kind of research, has real choices to be published
Conclusions

• Weaknesses

• Publisher bias

• If the review takes too much time, you will need to re-do some parts after a while

• Should be extended usually to other databases apart of the main ones. This will help the SLR effectiveness

• Depending the publisher, you will need to cut some parts of your SLR (regarding papers extension)
Conclusions

• To publish your SLR & Mapping:

  • Find what journals/conference use to publish them and the latest SLR papers published

  • Prepare your paper version of the SLR based on these latest papers published previously to your submission

  • If you will make a huge SLR, only part of it would be published by a journal/conference. The other part of the content/results could be available in your full Thesis volume
Do a SLR!
Acknowledgments
Acknowledgments

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Also thanks to my PhD supervisors that finally convinced me to start my SLRs.
References
References


References


This presentation is available in

http://www.slideshare.net/knowledgesociety/systematic-literature-review-mapping

http://repositorio.grial.eu/handle/grial/685
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