undertaking a literature review in the Sciences

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agenda

- What is a literature review? Why do we need this?
- How to organise your review
- Different types of review
- Tips & techniques for preparing your review and staying organised
- How to write - some basics and critical techniques
- How to search and find full-text sources
- References & copyright
what is a literature review?

Very broadly:

- A map of the landscape of existing research relevant for your thesis or paper.
- A justification / context for your chosen research problem.
- A critical analysis and discussion of other people’s work.
- A selection of established ideas, concepts, & methods for your own synthesis.
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what is a literature review?

Note:

- Your literature review needs to be written down but there is no single "correct" or accepted form.

- A good literature review anticipates the academic debate your thesis is going to initiate.

- The content and structure is usually very specific to the research problem you are addressing.

- The length and form required may depend on what is expected in your field and on the scope of your research problem.
a literature review is NOT

- Just an unreflected list of everything you have read in your research.
- An opportunity to show off to examiners how much you have read.
- An exercise in praising or cheapening other people’s efforts.
- A pointless torment every PhD candidate has to go through.
what do you know about your research field?

- Has your supervisor given you a reading list / suggested areas to look at?
- Which related pieces of literature have you read?
- What are you trying to find in the work of others?
- Are there any major debates between scientists in your field?
- What are you trying to achieve in your own work?

Exercise (5 mins)

- Write a couple of sentences about what you want to do in your PhD thesis.
- Write down up to 10 questions or issues addressed in the work that you have already read.
purpose of a literature review

In general, what are outcomes of a good literature review?

- A written theoretical foundation / context for your research problem.
- An identification and critical evaluation of any established concepts, methodological approaches, and theories relevant to your work.
- A solid basis for making informed methodological choices.
- A description of the main issues related to your research problem.
- An identification of key publications and people in the field.
purpose of a literature review

Examples of what a reader/examiner of your thesis might say:

- To demonstrate an understanding of the state of the art in your field.
- To show me where your ideas come from.
- To summarise, integrate, and generalise work that is relevant for your research.
- To evaluate this other work in the context of your own research.
- To identify gaps for making your own contribution to the field.
- To find a suitable place and link your work to the existing literature.
- To justify why you omitted certain work that I would initially think is also relevant.
- To inform and justify the synthesis of your own theoretical contribution.
Exercise (ca. 10mins)

Going back to the list you created earlier, try to answer the following questions:

- Is there any work on your list particularly influential to your own research topic? Why is that so?
- Is there anything on your list that you think is less relevant for your own project? Can you state a reason for this?
- Is there anything missing in existing work that your research could provide?
- Is there anything on your list that would form an essential prerequisite for your own research? What is it and why is it important?
- Are there any works on your list which take a different approach to the same problem? How would you compare them? Why is this problem relevant for your own research?
how to organise your review

Where to put the review in your thesis?

- Dedicated or Recursive?
  1. A part of the introductory chapter. (D/R)
  2. A separate chapter. (D)
  3. Has self-contained parts spread throughout the thesis. (R)
  4. A combination of 1+3 or 2+3. (D+R)

- There’s no generic „right“ way but one may fit your research project better than the others.

- Which one to pick also depends on what is accepted or expected in your discipline - consult with your supervisor.
types of review

The choice is yours!

- There are different established approaches to conducting a review of related work.
- Use and combine them according to your needs and objectives.
- Sometimes, picking one off-the-shelf variant is not sufficient. You may need to devise a review structure that works best for your objectives.
- Your structure may change and grow as you progress further in writing, gain more insight, or receive external feedback.

- Remember: Any material you present should be justified in that having it in your dissertation supports your overall thesis.
example 1: a telescopic approach

- Present the big questions and debates first.
- Increase the specificity of the material as you write more about your own research.
- Good for building a context for your research within those fields that provide relevant and instantly usable concepts, methodologies, or theories.
example 2: a theme-based approach

- Classify sources according to a common theme, concept, or problem.
- E.g., compare and contrast different methodologies or ideas within the same context (a shared problem they address, in the context of your own research).
- Find similarities and differences between different approaches.

- Good for evaluating other work in relation to your own research problem.
- Useful if you have different kinds of sources, or sources from different areas.
- Also: demonstrate how your research differs from that of others.
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Potential methods for doing X in the context of Y

- Established method 1
- Established method 2
- Established method 3

Variables used; Inputs required; Complexity
Nature of the results produced
Criticism
Previous application contexts
Useful for you?

e.g., application of search strategies in robotics
example 3: a taxonomic approach

- Combination of a theme-based and a telescopic review
- Allows classifying subjects according to your own criteria and requirements
- Suits more complex research problems
- Also useful if the standard paradigm of an established field is insufficient to address your research problem directly, i.e., needs re-interpretation and -classification to fit, or when you need to integrate research from different disciplines.
example 4: a source- or origin-based approach

- Compare artifacts/samples/events/publications/etc. from different geographic locations, historical periods, constrained sets of authors, etc.
- Evaluate issues in the context of the different locations, periods, or sources in general.
- Useful if the origin or source of your subject of study is a crucial part of your methodology. (analysis of the data, interpretation of results)

Source: “The Grim Reaper’s road map”
http://sasi.group.shef.ac.uk/publications/reaper/gr_eg_maps.pdf
example 5: a chronological approach

- Presentation of material based on when something happened or when it was created/discovered/published/etc.
- Used for historical research or showing the development/changes of a subject over time.
- Note that material presented this way is more difficult to interrelate conceptually.

which type works best for your subject?

Quick discussion:

Which of the different types presented may be more useful for your research project than others?

Can you articulate the reasons for this?
how to write - basics

- A common structure:

  Introduction: Explain to the reader how the review is organised
  Main body: Presentation + critical review
  Conclusion: Connect reviewed areas to your research questions.
how to write - basics

- Research narrative & Cohesion:

Make references to your review from the other chapters to develop and support your thesis.

Make sure the organisation of your review fits the problem that you describe in the introduction (or the framework laid out there). Both should complement each other.
how to write - critical writing techniques

- Compare and Contrast
  - Theories, perspectives, concepts, terms → indicate your own position

- Strategic & Selective referencing
  - Compound several sources that support your argument

- Synthesise and Reformulate
  - Take elements from various developments to enhance a point or create something new

Adapted from Ridley (2012)
how to write - critical writing techniques

- Agree, Confirm, Defend
  - Analyse merits, advantages, and limitations

- Support & Differentiate/Qualify
  - Concede the strengths of an existing position but differentiate your support by highlighting certain weaknesses, too.

- Reject
  - Reject a view and give concrete reasons for this - e.g., lack of evidence, or the applicability to your research problem

Adapted from Ridley (2012)
some tips & techniques around your review

- Where to start?
  - You already have!
  - Find additional starter questions as you discover more related work.
  - Approaches to exploring your research paths:
    - Starting from the fields nearest to your topic, going to broader issues.
    - Starting from the big questions, narrowing down to issues related to your specific topic.
    - Looking at different fields for approaches to issues that are relevant for you.
some tips & techniques around your review

- How to cope if there’s a huge heap of literature waiting to be read
  - Don’t read everything in detail on the first go.
  - Briefly scan each source first and decide if potentially significant or interesting - then read those more thoroughly.
  - Categorise work and focus on one (or two related) sub-problems at a time.
some tips & techniques around your review

- Effective note-taking
  - Try to summarise the work you are reading in your own words to save time later.
  - Always indicate when you’re using a quote from the original.
  - Try to find key words or categories for the source, including other related work.
  - Write down your thoughts / assessment of a source, together with the date.
some tips & techniques around your review

- Source and reference management
  - Decide on how to keep track of your sources before you start reading large volumes of literature.
  - Bibliographic / Indexing software may help.
  - Find out the expected format of referencing in your school / discipline.
finding examples of theses

- Access previous Sussex theses through Sussex Research Online (SRO)
  - [http://sro.sussex.ac.uk/](http://sro.sussex.ac.uk/)

- Use [EThOS](http://ethos.bl.uk) to find UK theses
keeping track of your references

- Ensure you have records of everything you have used
- Consider copyright clearance as you go along
- Referencing software can help you organise your work
starting to search

- Approach may vary depending on your familiarity with the subject

- Be prepared to use both keyword searching and citation searching

- Consider a range of material: books, articles, conference papers, theses, grey literature, archives and so on
choosing where to search

- Library subject guides are a good starting point

- Key databases in the sciences
  - Scopus
  - Web of Science
  - Science Direct
  - Nature

**Chemistry and Biochemistry**

**Key Resources for Chemistry and Biochemistry**

The following databases contain a variety of material, including journal articles, for your specific subject area. The brief descriptions beneath the titles will explain what each hold. To access, click on the title.

- **Nature**
  - Allows you to search for articles in journals published by Nature Publishing Group.

- **Reaxys**
  - Formerly known as Baldan Credo

- **Royal Society of Chemistry Journals**
  - Search RSC journals, including the flagship journal Chemical Communications.

- **Science**
  - The world’s leading journal of original scientific research, global news, and commentary.

- **ScienceDirect**
  - Contains full text and abstracts from over 2,500 journals in all fields of science, plus social sciences such as economics, management and business.

- **Scopus**
  - Includes the abstracts and cited references of over 16,000 peer-reviewed titles from more than 5,000 international publishers in the sciences and social sciences. Scopus includes references of all articles published since 1995, offering newly-linked citations across the widest body of articles available including Open Access and electronic-only titles. 20 million pre-1996 records captured without references go back as far as 1823.

- **Web of Science**
  - Provides access to the Science Citation Index, Social Sciences Citation Index and Arts & Humanities Citation Index.
finding full-text sources

- Sussex Library catalogue and online resources
- Inter-library loans through Sussex
- Other libraries - identify using COPAC
- SCONUL scheme - access to other university libraries
- Google Scholar
further information

- Other workshops offered by the doctoral school
  [http://www.sussex.ac.uk/doctoralschool/internal/researcherdev/events/](http://www.sussex.ac.uk/doctoralschool/internal/researcherdev/events/)

- Writing a Literature Review (Study Direct Module)

- Your school may offer additional training modules that are more specific to your discipline (research methods / skills)

- Introductory:

- Practical:

- Further in-depth:
Related workshops:

- Using Zotero at Sussex
- Using Mendeley to manage your references
- Writing a literature review
questions

- If you have any further queries email me at

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