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BSc Dissertation/MPhys Project
Literature Review Session

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With thanks to: Clive Dickinson, Pranav Bharadwaj Gangrekalve Manoj

Outline

Part I: The **what**, **why**, **when** and **how** of **literature review**

Part II: **Finding sources**

Part III: **Critical analysis**

Part IV: **Citations** and **bibliographies**

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Part I

The **what**, **why**, **when** and **how** of **literature review**

What is a literature review?

A **literature review** is **critical discussion** of the **existing literature** on a topic.

Literature reviews can be standalone but more often form part of the introductory material in journal articles, conference proceedings, technical reports, and theses,

and **your BSc Dissertations or MPhys Project report(s)!**

Why do a literature review?

Literature reviews:

- establish the **state-of-the-art**.
- give **context** and **background**.
- **motivate** research questions or hypotheses.
- **credit** work that has come before.
- contribute to the **evaluation** of results and conclusions.

When should you do a literature review?

- **When** devising a research question.
- **Before** starting a research project.
- **Whenever** the scope or direction of a research project changes.

How do you do a literature review?

- Establish the **scope**:
  - Which are the key topics?
  - Which key words will you use to search the literature?
- **Search** the literature:
  - Keep good records of search queries and results.
  - Skim first, delve second.
- **Read actively** and **critically**:
  - Record key points and where they come from.
  - Compare and cross-reference points between different sources.

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Part II

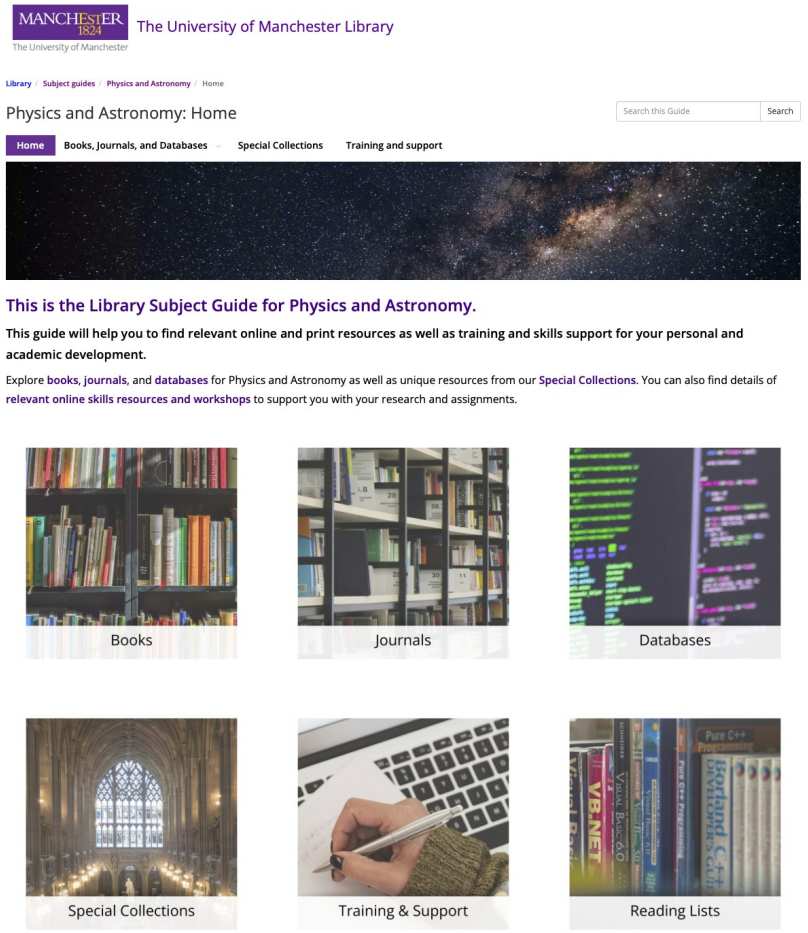
Finding sources

Library Subject Guides

The **Library** has **Subject Guides**, including one for **Physics and Astronomy**, which list:

- Books
- Journals
- Databases
- Special Collections
- Training & Support
- Reading Lists

Visit: https://subjects.library.manchester.ac.uk/



Common types of source

- Books
- Monographs
- Journal Articles, incl. Letters and Review Articles
- Conference Proceedings
- Pre-prints
- Dissertations and theses
- Datasets
- Recorded conference or workshop talks, seminars, or lectures
- Personal communications
- Webpages

Preprint archives

- A **preprint** is an author-produced version of an article that is released before it has been peer reviewed and/or published.
- Before articles are published in peer-reviewed journals, they are sent to referees who are asked to judge the quality and robustness of the work.
- Whether or not an article has been peer-reviewed, you always need to use scientific discernment to judge its quality and robustness.
- The most relevant preprint archive for physics is the arXiv: https://www.arxiv.org/
- After an article is published, authors often submit **post-prints** to e-print servers like the arXiv.
- Publicly funded research is commonly published Gold Open Access, making it freely available under a Creative Commons or similar licence.

Predatory journals and slop

- Beware of **predatory journals.**
- These often have less robust peer-review and editorial processes.
- Lists of potential predatory journals and publishers can be found at:
  - https://beallslist.net/
  - https://www.predatoryjournals.org

- There are also an increasing number of **scam conferences**.

- And beware **unscrupulous reproductions** of CC BY material and **AI slop**.

Some methodologies

- **Keyword searches**
- **Author searches**
- **Backward citation searches**
  These tell you which source an article has cited. This helps you to dig into the the past of the literature.
- **Forward citation searches**
  These tell you which sources cite an article. This helps you to find what has happened since and to catch up on the state-of-the-art.

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Part III

Critical analysis

Synthesis and evaluation

A literature review is NOT just a list of relevant references.

It is a **critical synthesis** and **evaluation** of the background and state-of-the-art of a topic:

- What has been done before?
- What comparisons can be made between sources, their results and conclusions?
- What are the strengths and weaknesses of these existing works?
- What can you conclude from your critical appraisal of the literature?
- How does this motivate your work and what will you add to the current state-of-the-art?
- How does you work, results or conclusions compare with the existing literature?

Other resources

- See also the slides by Pranav Bharadwaj Gangrekalve Manoj in the Year 4 WW Material.\
- Library workshops: https://www.library.manchester.ac.uk/training/my-learning-essentials/workshops/
- There is a wealth of resources provided by the Library:
  - "Planning and reviewing your search"
  - "Getting started with search tools"
  - "Getting started with subject databases"
  - "Using operators in your search”
  - "Evaluating sources on information”
  - "Getting the most from your reading”
  - "Thinking, reading and writing critically”
  - "Writing your literature review”
  - "Referring to other people's ideas in your work"

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Part III

Citations and **bibliographies**

Types of citation

1. **Sources that give context and background to your research.**

   This type of citation will more often appear in the literature review at the beginning of your report or dissertation. They provide the evidence base for your critical analysis of the existing literature.

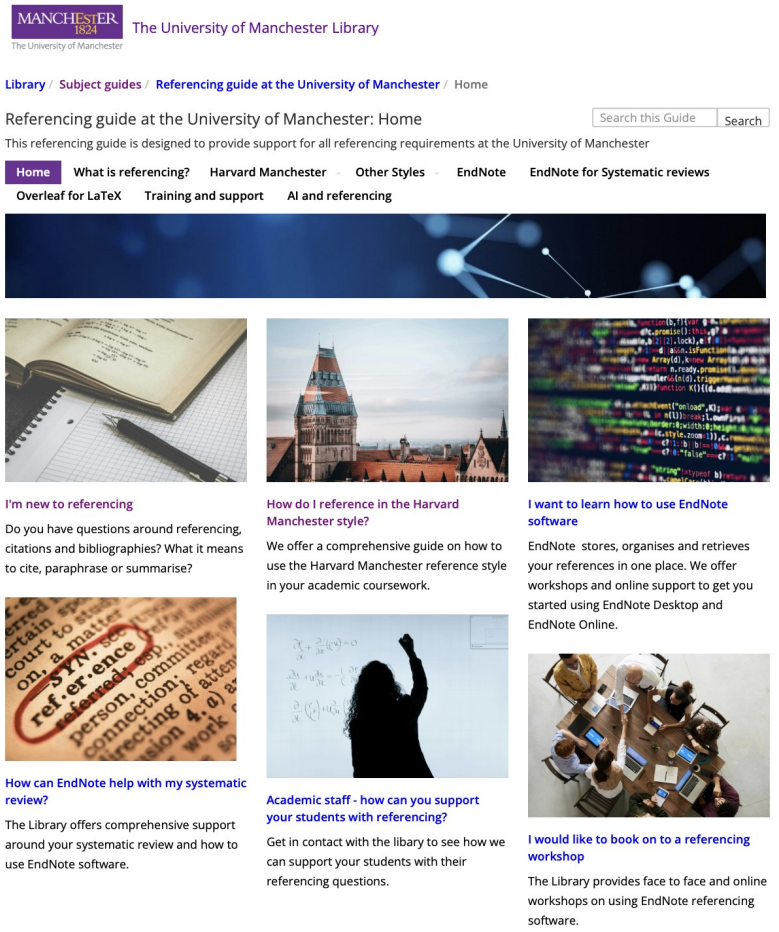
2. **Sources that you use actively to undertake or evaluate your research.**

   This type of citation will more often appear in the main body of your report or dissertation. They provide the evidence against which you can critically evaluate your research, results and conclusions.

Support with referencing

- The University of Manchester Library Referencing Guide https://subjects.library.manchester.ac.uk/referencing

- Your supervisor can also offer advice on referencing and field-specific conventions.



There are many referencing styles.

- You will find both **numerical** and **Harvard style citations** in the physics literature.
- You will get a feel for the field-specific conventions when going through the literature for your dissertation/project, but you can also discuss this with your supervisor.
- **Key points:**
  - Use one referencing style consistently throughout your document.
  - Ensure that citations contain the complete bibliographic data appropriate to the type of source.
  - Ensure that the format and style of all bibliographic entries are consistent, including, e.g., the order in which author surnames and initials appear.

Bibliographic tools

There are many reference managers on the market, incl.:

- EndNote
- Zotero
- Mendeley

Citations in various formats, including EndNote and BibTeX, can often be exported directly from journal webpages or from databases, incl. ADS, INSPIRE-HEP and arXiv.

Beware: Automatically generated citations and bibliographies can contain errors or be incomplete. Always check them carefully!

Generative Artificial Intelligence (AI)

Read the University's **Guidelines for Staff and Students Using or Developing AI**:

https://documents.manchester.ac.uk/protected/display.aspx?DocID=75355

Example acknowledgement

ChatGPT (https://chatgpt.com) was used in the preparation of this report to search for and summarise relevant literature, but no content generated by Generative AI is included directly in the document.

Adapted from the above guidelines.

Some top tips

- Keep good records of where you have sourced information. (For the MPhys Project, this is one role of your “lab book”.)
- Don’t leave it until the last minute to write your literature review.
- Check all citations are complete and consistently formatted in your bibliography.
- Make sure that book references contain the publisher’s name and location.
- Make sure to include “accessed” dates and URLs for online sources.

Summary

- **Literature review** is an **integral** and a **foundational** part of doing research.
- It is an **active**, **critical**, and **evaluative process**.
- Discuss potential sources, literature review methodologies, referencing styles, and field-specific conventions with **your supervisors**.
- Take advantage of the wealth of resources available to support you, including via the **Library** and **My Learning Essentials**.