Planning your literature search
Effective search techniques

Research Guide

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Planning your literature search
1 Introduction

The guide provides information on how to develop a search strategy to enable you to identify key information sources for your final year research project. It also provides information on keeping a record of the information you find using bibliographic reference management software.

Aims of this guide

This guide aims to lead you towards effective techniques for searching information resources on a topic. This guide will focus on look at self-directed searching (searching for information on a subject without prior reference) and citation searching to trace academic arguments.

Coverage includes:

- Planning a literature search, taking into account all sources of information available;
- Effective information retrieval skills for searching electronic information resources;
- Use of bibliographic information to explore the development of ideas, practices and research and identify other useful sources;
- Tips on how to manage and record information.

Getting Help

The library’s website is the main source of information about the Library, its resources and all of the services it provides. You will find tips for using the Library, staff contact details, information about humanities, social sciences and science resources, and guides to using our collections and electronic resources http://www.york.ac.uk/library.

If you need help anytime during your academic studies, you can:

- General library enquiries:
  - Ask at the Help Desk in the Library
  - Email: lib-enquiries@york.ac.uk

- Subject specific enquiries:
  - Contact the Academic Liaison Librarian for your subject, http://subjectguides.york.ac.uk
2 Literature Searching

A research literature review is “a systematic, explicit, and reproducible method of identifying, evaluating and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners”.¹

Why is literature searching crucial?

Literature searching is an essential part of any research project because it enables you to acquire an understanding of your topic, its key issues, and an awareness of relevant research that has already been conducted. Through the literature and review searching process you will:

- Identify work done or in progress that is relevant to your work;
- Critically evaluate the information identified to provide new insights;
- Prevent duplication of previous research endeavours;
- Identify any errors and pitfalls of previous work and avoid these in your research;
- Inform the design of your research methodology;
- Identify gaps in research;
- Identify current concerns and issues;
- Provide history of a topic.

2.1 Planning your search

Creating an effective search strategy will help to ensure that you find the key material for your research. Almost every online information source incorporates a search function, but the level of sophistication of this function varies greatly. A strategy can be applied to any searchable information resource, and is particularly helpful when searching large bibliographic databases, or resources like the Web.

Good planning will:

- ensure you find the key material for your research
- be helpful when you find too much information, or not enough
- be helpful you when you don’t retrieve the results you expect
- save you time

Spending time thinking about your search topic, considering keywords, and devising a strategy is guaranteed to improve the quality of your results, and save you time in the long run.

Process

1. Define what you want, and what you don’t
   - Subject:
     → Identify the main concepts within the research question.
     → Mind mapping around your subject can help.
     → Think of your research as a question/statement, or series of questions/statements. Addressing each question/statement separately when you come to devise your search strategy can be helpful.
   - Level and purpose – e.g. “quick search”, background, review, systematic review
   - Targeting certain types of information: primary sources, journal articles (peer-reviewed or all), statistics and data sources, conference papers, books, theses, news items, government publications, grey literature, legal materials....
   - Limiters: currency (historical, current, point in time); geography (UK, European); language (translation, native language). Time available/needed.

2. Devise a search strategy
   - Identify search terms. Identify synonyms and related terms for each concept. Take account of plurals and variations in spellings.
   - Methodology – use truncation and Boolean operators, and make use of subject/thesaurus headings.
   - Select sources to search – these will depend, not only on your subject, but on the other criteria you’ve identified above.

3. Conduct searches
   - You will perform more than one search on a given database.
   - Perform a search, analyse the results you are finding, refine the search.
   - Use directed self-directed, citation searches to locate relevant information.

4. Record useful references
   - Make a note of any useful sources you identify throughout the research process.
   - Consider bibliographic software to create a database of references e.g. EndNote.

5. Document your search
   - Record search history.
   - Save searches on the electronic databases and set-up search alerts.

6. Obtain full-text of items found
   - Check if we have full-text access to articles and books.
   - Use interlending service to access resources that are not available in York.

7. Critically evaluate the information you find
   - Develop criteria for critically evaluating information resources.
### 2.2 Example search strategy

**Topic:** Climate change is commonly believed to be man-made. What evidence is there to refute this claim?

<table>
<thead>
<tr>
<th>Main concepts</th>
<th>“climate change”</th>
<th>natural</th>
<th>“greenhouse gases”</th>
<th>environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms, related, thesaurus terms, and broader or narrow terms (incl. variations on spellings and plurals)</td>
<td>“global warming”</td>
<td>volcanic</td>
<td>NOT</td>
<td>anthropogenic</td>
</tr>
<tr>
<td></td>
<td>CO2 emissions</td>
<td>solar</td>
<td></td>
<td>human</td>
</tr>
<tr>
<td></td>
<td></td>
<td>astronomical</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It’s crucial to start the research process by planning a search strategy, but you can make your own judgement about where to search. The nature of your research is likely to have some bearing on this as certain topics will require you to focus on the different information sources available to you. At every stage of the process you should evaluate the information you find, to ensure that it is suitable for your purpose. It’s crucial to keep full records of any potential useful references.
3 Accessing Electronic Resources

The Library subscribes to a vast array of electronic resources that will be useful for your academic studies, including full-text journal archives, bibliographic abstracting and indexing database, datasets and statistics, government publications and more.

3.1 E-resources Guide

E-resources Guide (http://subjectguides.york.ac.uk/e-resources) is the gateway to the Library’s electronic resources. You can either use the A-Z list to access specific resources or browse resources by subject or category. If you are unsure which resources you need to search you can click on the i by the side of any resource to find out more information.

3.2 Links to the full text

Many of the bibliographic electronic resources include links to the full text of journal articles. However, this is not always the cases and there are a few points that you should bear in mind:

- The link from a reference to the full text article will only work if the University Library subscribes to that particular journal.
- If you are asked to pay for looking at a journal or article or are asked to supply a password and your IT Services username and password does not work, then the Library will either not have a subscription to that journal at all or else not subscribe to the year you require.

Find it links

Clicking on the Find it @ York link from the record in a database will enable you to check whether the University of York library has a subscription to that item. A pop-up window will appear, offering a range of options to retrieve the item:

- If an article is available online, the publication details will be displayed with a link to the the online journal provides where you can access the full-text of the article.
- If the material is available in print then a list detailing the Library holdings will be provided.

If you find a useful article or book which is unavailable at the University Library, you can use the Interlending and Document Supply service to request a copy from another Library (see webpage for further details http://www.york.ac.uk/library/borrowing/interlending/).
4 General Search Tips

The following section of the guide provides some general tips for searching electronic information resources. The tips in this guide provide example for different search commands used in Scopus and Web of Science. Always check the online help pages of the database before conducting a search to ensure that you are entering the right command symbols.

The majority of the search tips detailed in this section are designed to be incorporated in a self-directed topic search. If you are searching for a known reference (directed searching) you should explore the search tool you are using for field search functionality that will allow you to conduct an Article Title/Journal Title/Author search.

4.1 Truncation and Wildcards

Sometimes you might want to find more than just exact matches to a search term. Truncation symbols and wildcards let you substitute symbols for one or more letters.

With truncation and wildcards, you can match:

- both singular and plural forms of a word;
- words that begin with the same root (truncation);
- words that can be spelled in different ways;
- variations between UK and US spellings.

Symbols used for truncation and wildcards:

**Truncation**  
* To search for terms with multiple endings use the * symbol in Scopus and Web of Science.

The truncation symbol stands for any number of characters, including none, and is especially useful when you want to find all words that share the same root. For example:

- Pollut* finds pollution, pollute or polluted
- Environment* finds environment or environmental

Note that you must enter at least three characters before the truncation symbol. So a search for o* is not allowed, you would need to search for obj*

**Wildcard**  
? To search for terms with variable spellings use the ? symbol in Scopus and Web of Science. This symbol stands for zero or one letter and is especially useful when you are searching for British and American variations in spelling. For example:

- Defen?e finds defense (American) and defence (British)
- Colo?r finds color (American) and colour (British)

Multiple question marks in a row stand for the same number of characters as
there are question marks (both Scopus and Web of Science). For example:

Psych?? ?y finds either psychology or psychiatry but not psychotherapy

If you see a message about a search being invalid, either try adding more letters before the truncation or wildcard symbol or check the database help to ensure that you are entering the right symbol for that database.

4.2 Boolean Operators

Boolean operators, sometimes referred to as logical operators, can be used to create relationships between search terms and results sets. They allow you to find the result of the intersection of two search terms or result sets, the combination of two terms or result sets, or the exclusion of a term or result set from a search.

There are three Boolean operators:

AND The AND operator specifies that both words on either side of the operator must occur in the part of a record you’re searching for that record to match. For example:
alcohol AND violence only retrieves records that contain both alcohol and violence

OR The OR operator specifies that one or the other or both of the words on either side of the operator must occur in the part of a record for that record to match. For example:
viole nce OR abuse find records in which either the word violence or the word abuse or both occur.

NOT The not operator specifies that the word before the operator must occur but the word after the operator must not occur for a record to match. For example:
crime NOT murder finds all records in which the word crime occurs except the ones in which the word murder also occurs.

Please Note: in Scopus the command would be crime AND NOT murder

Generally speaking, entering two or more search terms without any logical operators between terms is the same as using the AND operator. However, certain indexes, automatically conduct a phrase search. To find out what the database is doing try conducting some practice searches and compare your results.

4.3 Phrase Searching

Enclosing your search terms in quotation marks yields results in which the words appear in the specified order adjacent to one another. This may be helpful for keyword and full-text (entire document) searches, especially when you are searching for an exact phrase. For example:
“climate change” will only retrieve records where the word climate is followed by the word change, in that order with no other words in between them.
If the phrase contains either the word and or or not, or a 'stop word'\(^2\) and you want these words to be used literary, not as Boolean operators then you must enclose your phrase in quotation marks. For example, if you typed sink or swim, the word or would be treated as a Boolean operator. However, enclose the phrase in quotation marks as: "sink or swim" and the system will search for those three words together, in the order listed.

### 4.4 Proximity Operators

Proximity operators are used between two search terms to indicate that the terms must occur in a record within a specified distance of each other for that record to match. Words that are close to each other are more likely to be related than words that are far apart.

A proximity operator has two components:
- A *letter* or *symbol* that indicates the direction
- A *number* that indicates the distance in words

There are two proximity operators:

- **W/n** or **NEAR/n**
  - The W (within) or near operator specifies that the words on either side of the operator must occur within \( n \) words of each other in either direction for a record to match.

  **Scopus**

  Search terms within "n" terms of each other (where "n" is a number). Either word may appear first: social *w/3 housing*

  **Web of Science**

  Search terms within "n" terms of each other (where "n" is a number). Either word may appear first: social *NEAR/3 housing*

  If you type in NEAR without a number the database will retrieve records where the terms joined by near appear within 15 words of each other: social *NEAR housing*

- **PRE/n**
  - The PRE (preceded) operator specifies that the word that follows the operator must occur within \( n \) words after the word that precedes the operator for a record to match.

  **Scopus**

  The first term preceding the second by "n" terms (where "n" is a number):
  
  *capital PRE/3 punishment*

Proximity operators are most useful in indexes of large areas of text, such as keyword and full-text indexes.

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\(^2\) Stop words are small words that are not indexed in a database e.g. a the if of etc. Usually if you enter them into your search then the database will not include them in your search.
Note that proximity operators can be used only between two words, not between a word and an expression within brackets:

- Invalid expression: free w/3 (speech or press)
- Valid alternative: free w/3 speech OR free w/3 press

### 4.5 Parenthesis (brackets)

The search system follows a particular order of evaluation when there are two or more operators in a search expression. First, wildcards are evaluated. Next come proximity operators, which are tightly bound to the words on either side of them. Finally, the Boolean operators are evaluated: first not and and, followed by or. This order can vary across databases so check the online Help if you are unsure of how your search query is being processed.

You can change the evaluation order of the Boolean operators by using brackets. When you use brackets, the search system performs the operation within brackets first, and then merges the result with the part of the entry outside the brackets. For example:

- planet or “solar system” and observation specifies that you want to find records that contain either the word planet or both the words “solar system” and observation. Equivalent to the expression planet or (“solar system” and observation)
- The search expression (planet or “solar system”) and observation specifies that you want to find records that contain either or both of the words race or colour and that also contain the word discrimination.

### 4.6 Additional tips for improving your self-directed search on a topic

1. Only use words relevant to your topic/subject area in the search
2. Leave out connector words like a, and, the, if, of, or, etc. Although these words are often ‘stop words’, functionality will vary so you may find that the database searches for these, so inclusion of them in your search query will significantly dilute the results.
3. If your search includes several words, link these using the Boolean or proximity operators where appropriate between each term.
4. If you try a search the first time and get no results, check your spelling and increase the number of synonymous/alternate terms.
5. If you try a search the first time and get too many results either decrease the proximity range or add another concept to your search to make it more specific.
6. Increasing the number of key terms used in a title search query can correspondingly decrease the likelihood of getting a relevant result because in some cases it can OVER limit the search by excluding articles that don’t have those specific words in the title. Therefore, be reasonable in the number of words you are using and try sticking to the key words for your topic.
7. Remember, you can always use the “search within these results” option to search for another key term within a set of results.
5 Citation Searching and Finding Related Materials

A key component of the literature searching process is the identification of related books, articles and other research outputs that form the foundations of the subject area, topic or school of thought. When conducting a literature research you can employ a number of techniques to identify the links between different scholarly information resources, these are detailed below.

5.1 Tracing academic arguments

- **References** – what has been referred to by a particular book or article and will be listed in the bibliography. Searching for references provides you with additional information relating to the arguments presented in the research. If an article is referenced, in an article you are citing, then it is likely that it will be another useful source of information to inform your own research.
- **Citations** – a list of references to a single book or article. Citation searching can be used if you have already identified a relevant book or journal article. It allows you to search forward in the published literature, starting from your known reference, to locate new articles which cite your known reference in their bibliographies.

Reference and citation searching, as well as enabling you to identify relevant articles related to your topic and trace the process of research, can prove useful in the critical evaluation process. By examining the articles reference and those citing the material, as you can check the validity of the research based on the information used and the impact it has subsequently had on the field of research. If an article is highly cited then it will have a higher impact factor and usually be of more interest researcher both in and outside that field of research.

However, you should not rely solely on the citation information when evaluating material. Older articles may have a higher number of citations but newer research output may undermine their findings. More recent articles will not have as high citations counts due to the length of time they have been available but can include ground breaking finding and ideas.

**Database functionality**

<table>
<thead>
<tr>
<th>Database</th>
<th>Linked list of References</th>
<th>Number of citations (from other articles referenced in the database)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProQuest databases</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>EBSCO databases</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Scopus</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Web of Science</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Google Scholar (http://scholar.google.co.uk/) also provides links to cited references so if you have found a useful article and you want to conduct a citation search you can use this search engine for this purpose.

Be aware that the number of citations listed for an article will vary across search tools as they will only bring up articles included in their index which cite the article.

### 5.2 Finding related material

- **Subject Headings** – official terms that have been selected and assigned to describe the content of an article/book in a bibliographic database. This functionality is also available in the library catalogue. These headings are useful because they designate one term to describe something that may be referenced by various different terms. Items on a related topic will include the same indexed terms so you can use these to find related material on a topic/subject.

- **Related article** – link other articles indexed on the database or search engine that are on a similar topic. The various databases/search engines will employ different algorithms to determine relevance and relationships between items. These may include, similar subject headings, similar keywords, common references etc. You can use this functionality to identify other materials related to your research.

Not all databases and search engines will provide this functionality. Explore the capabilities of the search tool you are using to improve your search and identify relevant material.
6 Recording your searches and your results

In the early stages of carrying out research, it is useful to keep a record of the way in which you search each resource.

Make a note of your keywords, what combination of keywords you use, any date limitations you impose and the number of results you find. Having a record of your searches means that you can reconstruct the search at a later date if you need to check your information.

6.1 Search alerts

It can take time to devise your search strategy and develop a search string that retrieves relevant results. Many of the electronic databases will allow you to save your search history so that you can re-run a search or edit it at a later date. Explore the search functions in the database you are using to see if you can save your searches or set-up a search alert.

6.2 Recording your references

When making a note of useful references, remember to write down all of the details you will need to cite the work in your bibliography. Your departmental handbook will give you guidelines on how to format your references.

Bibliographic software packages are available which enable you to organise your lists of references and create bibliographies. Using a reference management package you can:

- Store, organise and search for references in your own personal library
- Import references downloaded from electronic sources
- Add citations to your word-processed document and create your bibliography in a number of citation styles

The University supported bibliographic software is EndNote and EndNote Online. We recommend that undergraduate students use the online version EndNote Online as this is free to access both on and off campus.

A workbook on EndNote Online is available on the IT Services website. IT Services have also developed an online tutorial that you can work through which provides guidance on using EndNote Online and a Reference Management website.

For further details about EndNote take a look at the IT Services web page: http://subjectguides.york.ac.uk/endnote.