# Searching the Rainbow

The Ten-Step Literature Review

Laura Ennis, September 2017

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Scope: Your Subject

Background information can help you prepare for further research by explaining all the issues related to your topic, especially when you're investigating a field that's unfamiliar to you. Your initial search will be a quick, non-comprehensive, search of existing literature designed to help you gain an overview of the range and depth of research that already exists within your research field.

Where to look

To begin your scoping, start thinking in terms of broad subjects, and then narrow down toward your topic. Make a note of the keywords, terminology, concepts, and theories that you discover along the way. You’ll find these useful later on.

- Get an overview of your subject area from your Subject Guide.
- Check for background information in dictionaries, handbooks and encyclopedias.
- Look for facts in statistical guides, almanacs, biographical sources, or handbooks.
- Explore concepts and ideas using LibrarySearch and Google Scholar.
- Identify new areas of research in newspapers and magazines.

Questions to consider

- Can you build upon the work of other researchers in this area?
- Are there key authors or journals that you can follow?
- Can you now identify suitable search terms for a follow-up literature search?
- Are there gaps in existing research? If so, how can you use these to focus your own research question further?
- Do you need to narrow the scope of your own research or set other limits upon it?

How to proceed

If you come across methodologies and theoretical frameworks that are new to you make sure you take some time to understand what they mean. Do you need to learn more about these techniques? Explore LibrarySearch and Sage Research Methods Online for books, papers and case studies on these.

Summarising your findings (key papers, authors and journals identified so far) and discussing them with your supervisor or Principal Investigator can be useful for moving toward a more specific research question for your project.

References and Further Reading

Refine: Into a Question

For some, choosing and narrowing down their chosen topic is the hardest step when completing an assignment, but this need not be the case! A good essay answers a clearly defined question or set of questions. Framing your topic as a question will help you narrow down results when searching for information, but also because it identifies for you and the reader, what you want to know.

Is there anything about your current discipline that excites your curiosity, or alternatively irritates or annoys you?
You will find it far easier to research and write about a topic that you find personally interesting. Recent news stories that grabbed your attention, or social and political issues that you feel strongly about can be potential sources of research interest. Talking about your research interest with a helpful friend or colleague can also be useful for uncovering issues or alternate viewpoints you might not have considered before.

What can you explore further?
Flesh out your topic by considering the discussion points you will use in your answer. Your answers will probably change throughout the course of your research, but that is what research is all about! Consider the following points of view when attempting to draft your research question;

Why did you choose the topic? What interests you about it? Do you have an opinion about the issues involved?

Who are the information providers on this topic? Who might publish information about it? Who is affected by the topic? Do you know of organisations or institutions affiliated with the topic?

What are the major questions for this topic? Is there a debate about the topic? Are there a range of issues and viewpoints to consider?

Where is your topic important: at the local, national or international level? Are there specific places affected by the topic?

When is/was your topic important? Is it a current event or an historical issue? Do you want to compare your topic by time periods?

Has this topic been explored by other people?
Based on the scoping you will have done earlier, you should already know if this is the case. Replicating a study can be a useful learning experience, and will add evidence to the growing body of literature on your topic. However, be wary of researching a topic that has been covered exhaustively by others, as you may find that it is difficult to contribute anything new to the discussion. Conversely, choosing a topic that no one has written about has its own pitfalls as you may struggle to find supporting evidence and literature to corroborate your hypothesis.
Too broad?

Trying to answer a broad topic will take too much time and effort on your part—often far more than is needed. You will know that your topic is too broad if your initial results lists are too large to manage. Finding less information of a more relevant nature is important here. Combining the following approaches will help you to narrow the focus of your research topic;

**Theoretical.** Limit your topic to a particular approach to the issue. For example, if your topic concerns conservation, examine the theories surrounding biological diversity.

**Topical.** Consider only one piece of the subject. For example, if your topic was conservation, you could choose to investigate volunteer-led conservation.

**Historical.** Limit the time span you examine. For example, on a topic in conservation, contrast government attitudes towards coastal conservation in the 1950s versus today.

**Relational.** Limit by age, sex, race, occupation, species or ethnic group. For example, in marine conservation, you could contrast efforts to protect one species of marine mammal with those used to protect another species.

**Geographical.** A geographic analysis can provide a useful means to examine an issue. For example, if your topic concerns conservation, investigate regional differences in conservation, for example; between Great Britain and Australia, or between Northern Ireland and Scotland, or between the Hebrides and the Borders.

Too narrow?

Conversely, if you are not able to locate enough relevant information at the beginning of your research try thinking of related ideas, or read some background information first. You may not be finding enough information for one or more reasons;

**Your topic is too specific.** Generalise what you are looking for. For example, if exploring the psychological development of Eastern-European migrant children in Scotland is too narrow, broaden your topic by generalising to all migrant groups in Scotland, or in the United Kingdom.

**Your topic is too new.** Good research takes time. If your chosen topic is a very recent discovery you may not be able to find much discussion beyond news articles. Consider broadening the scope of your topic by examining related subject areas or previous approaches.

**You have not looked far enough.** A comprehensive researcher makes use of multiple sources of information including databases and search engines. Try searching another database for your subject, or try a different search engine.

**You are using uncommon words or jargon.** Authors have lots of different ways to express the same thoughts, so be sure to make good use of synonyms and related terms when searching. When reading background information, note how your topic is expressed in these materials. What words or phrases are the experts using?
What kind of question will you ask?

Your essay will attempt to answer a question, or set of questions, but it is important to identify the kind of questions you will be answering as this will have some bearing on how you conduct your research and how you write your argument. Essay types take many forms, expository, analytical, persuasive, argumentative etc.

**Descriptive.** A descriptive essay identifies and defines a group, method, theory, or variable and communicates deeper understanding through the process of description. Used mostly in qualitative investigations and surveys, descriptive research questions do not include an experimental aspect. In answering a descriptive question your language might be used to discuss, explain, examine, or illustrate. For example, what is psychological resilience? Or, what are the most common symptoms of diabetes in felines?

**Observational.** An observation of the relationship between two or more variables where one of them is not controlled by the researcher. Because of this, observational essays are common in the social sciences, psychology and in the study of disease. For example, can mapping outbreaks show where diseases originate? Or, inflammatory markers and the risk of coronary heart disease in men and women.

**Compare/Contrast.** Take two or more groups of variables and note the differences and similarities between them. These types of essay questions are usually expository. This approach is frequently used in experimental research. In answering a question of comparison or contrast you might evaluate, examine, or critically analyse. For example, a comparison of ankle injuries in both rugby and netball. Or, how do strains of *Salmonella* differ from *Francisella* at an intracellular level?

**Relational.** Like the above, relational questions explore two or more groups of variables. However relational questions explore the possibility of a causal relationships between these and how they interact. For example, do counselling interventions affect rates of reoffending? Or, what is the relationship between exercise and longevity?

**Causal.** Wider in scope than a descriptive essay. A causal essay explores the different factors that cause a particular variable to occur. You can focus on the cause, the effect, or a combination of both. For example, what are the possible causes of colony collapse disorder? Or, the wider effects of low social capital on Scotland.

References and Further Reading


Define: Your Search Terms

After deciding on a topic, take some time to identify what search terms you will be using. Authors have many different ways of writing about the same topic, and will use slightly different vocabulary. There are many ways to do this – you could use a mind map for instance, or in evidence-based research the PICO method is also useful (Population/Patient/Problem, Intervention (or sometimes Exposure), Comparison, and Outcome.

Synonyms
Using the verbs and nouns in your topic collect a list of related and alternative terms, or synonyms. Having a dictionary, thesaurus, or even an encyclopaedia on hand for this is sometimes useful. For example;

What impact have different models of tourism had on the quality of life for residents in Goa, India?

Breaking down the question to get a set of terms might look like this;

Impact: evaluation, consequence, cause
Tourism: travel, pilgrimage, journey, sightseeing, safari
Residents: citizen, inhabitant, native, local, workers

Terminology
Now look at the key terminology related to your choice of topic. This will include a range of different terms including;

- important authors or theorists,
- prominent theories or concepts,
- key research reports or legislation,
- major genres or movements, and
- official terminology connected to your topic.

Related terminology is linked to your original search terms by subject matter, instead of being a synonym or broader or narrower keyword. A basic knowledge of your subject is critical here, so if you find yourself struggling go back to the Scoping stage. As an example, take a look at the possible subject headings in the following research question;

What impact have different models of tourism had on the quality of life for residents in Goa, India?

Keep in mind broad terms, as well as narrowly defines ones. For example, terminology related to the above might look like this;

Models of tourism: Paul Eagles, ecotourism, health tourism, adventure tourism, volunteerism

Quality of life: The World Happiness Report, social capital, health, fulfilment, safety, employment, economic development
Variations
Words change over time and geographies. Keep the following variations in mind when collecting your keywords:

**Spelling:** cheque/check, labour/labor, tonne/ton, woollen/woolen etc.

**Plurals:** For example Octopus and the plurals Octopuses, Octopi, and Octopodes

**Acronyms:** World Health Organisation (WHO), Scottish Environmental Protection Agency (SEPA), and Radio Detecting And Ranging (RADAR) for example.

Congratulations! You now have a collection of suitable search terms with which you can begin your search.

References and Further Reading


Identify: Resources

Information comes in an endless variety of formats and is located by different means, in print and online. Some information is peer-reviewed, while some is not. When deciding whether or not to rely on a piece of information it is important to establish if it is credible. Generally speaking, work that has undergone the peer-review process is reliable. Peer-review is the process of submitting work for evaluation by peers who are familiar with that subject. It is a way of reviewing a piece of work for factual inaccuracies, flaws in reasoning and arguments, as well as academic fraud. The aim of peer-review is to establish the credibility of a piece of work, letting others know that it is a reliable source of information.

Sources of Information

When looking for academic literature there are several sources to choose from. An informed researcher will use multiple sources of information for their research project.

Abstracts and Indexes

Abstracts and indexes contain bibliographical information about academic publications, including journal articles, monographs, and book chapters. These databases do not usually contain the full-text, but the reach of their searches is far wider. If you find an item that you would like to read, you can order it via Inter Library Loan.

Full-Text Databases

As the name suggests, full-text databases contain all the publication information as well as the full-text of journal articles, monographs, and book chapters. These databases may also include results from national and local newspapers, as well as magazines. For more information about the full-text databases for your subject area consult your Library Subject Guide.

LibrarySearch

The Library catalogue contains information on all of the Library holdings at Edinburgh Napier University. Here you will find thousands of ebooks, videos, images, and journal articles, alongside traditional bibliographic entries for books and journals held in our collection.

Union Catalogues

Union catalogues provide access to the merged catalogue information of multiple libraries, allowing you to search for information held by different institutions. If you find an item that you would like to read you can order it via Inter Library Loan.

SALSER: search for items held by Scottish academic and research libraries. http://edina.ac.uk/salser/

Copac: search catalogues of about 90 university, national, and special libraries throughout the UK. http://copac.jisc.ac.uk/

SUNCAT: search the title information of print journal holdings of university, national, and special libraries throughout the UK. http://edina.ac.uk/projects/suncat/

The European Library: search the 48 national libraries within the European Union. http://www.theeuropeanlibrary.org/
Repositories
Repositories are collections of works that are organised either by institution (such as Edinburgh Napier University’s Research Repository) or by subject. Subject repositories are excellent resources for finding grey literature and links to published research in your chosen field. For more information about subject repositories in your area of interest consult your Library Subject Guide.

Types of Information

Textbook
Textbooks give a general overview of a topic, outline the popular theories and points of view, and are written with learners in mind. Textbooks are useful for students who are beginning in a field of study, and for those looking to refresh their knowledge of a subject.

Monograph
Monographs are academic texts that are compiled from original research, and give a detailed analysis on a specialist topic. Monographs differ from regular books in that they are often, but not always, based on refined and simplified doctoral theses and as such, have undergone peer-review. Monographs are useful for in-depth learning about a subject and for refining arguments.

Edited Book
Edited books of essays or chapters are written by different authors and compare and contract schools of thought on particular topic. The essays or chapters undergo peer-review before being included in the edited book. An edited book is useful for gaining an overview of a subject from multiple points of view and familiarising yourself with popular points of debate.

Journal
Journals are published at regular intervals, and often devoted to a particular field of interest. Some journals publish articles on a variety of topics, while others have a very specific focus. Journals are useful for developing a sophisticated overview of a subject, and keeping up to date with developments in a particular field of research because they are published regularly.

Conference Paper
Conference papers or sometimes Symposium or Seminar papers are published in conference proceedings, and are often proposals for new investigations into a particular topic, or reports on recent investigations into a topic. While conference papers do undergo peer-review, they are not as polished as book chapters, or journal articles. Conference papers are useful for keeping up to date with recent developments within a particular field of research.

Festschrift
Festschriften are often written by peers as a tribute to a prominent author or theorist, and cover different discussions about their body of work. Like edited books, Festschriften often undergo peer-review. Festschriften are useful for understanding a particular theorist’s work.
Newspaper Article
Newspaper articles are short articles that cover a recent event in brief detail. Some newspaper articles are objective reports of the news, while others represent an opinion, and may contain bias. Newspaper articles are useful for locating historical facts about events or people. Advertorials are newspaper articles written by commercial sponsors, and may appear objective when they are not.

Theses and Dissertations
Theses and dissertations are usually archived by the institution where the research took place. All theses and dissertations undergo rigorous peer-review, and contain specific and very specialist information. A thesis or dissertation will almost always contain a chapter dedicated to an overview of the literature on a subject and can be a good place to look for in-depth information.

Legislation and Policy
Legislation is the enacted will of parliament, while policy documents are official documents that can take for of a press-release, speech, or notice on particular topics or issues. Legislation changes over time, according the tastes of the public and current parliament. All British legislation and policy documents are available to read for free online.

Government Publications
These are official documents usually published by a department or ministry on a particular topic or issue. They may contain directives, discussions, and research findings. In the United Kingdom all government publications are available to read for free online.

Grey Literature
Grey literature is a term used to describe information that is not published through traditional means. Grey literature might include working documents, technical reports, company reports, pamphlets, leaflets, local records, and even conference proceedings and theses. The absence of bibliographic data such as an ISSN, ISBN, or DOI can make locating grey literature difficult. Additionally, not all grey literature undergoes peer review.

Dataset
A dataset is collection of data recorded as part of a research project. Because you have not collected the data yourself, it is known as secondary data. Datasets can be obtained from official sources, such as from government sources, or from academic sources such as repositories.

Types of Journal Articles
It may surprise you to learn that there are many types of journal articles as well. While they are all peer-reviewed, not all journal articles are primary literature or research. Read on to learn the different types.

Original Research Article
Also called simply Journal Articles, these are precise and short discussions (3,000 to 6,000 words) that focus on a single niche subject and are subject to peer-review before being published. These articles present original, primary research and often include sections on methods, results, and discussion. Journal articles are useful because they often contain original research or data, and because they provide an in-depth analysis of single point of interest in a subject.
Letters
Also called, Opinion, Commentary, Perspectives, or Communications, these are brief articles present the author’s interpretation or analysis of a particular topic. They are used to draw attention to recent scientific developments that may stimulate further research, or to critique or discuss recently published research.

Review Article
Not to be confused with book reviews, review articles provide a comprehensive overview and summary of the existing research in a particular area. There are different types of review article; literature review, systematic reviews, and meta-analyses among others. Because review articles are summaries of existing research and do not usually report original results, they are classified as secondary literature.

Book Review
Book review articles are short (500 words) summaries and critiques of recently published monographs. These articles draw attention to recently published book within a subject area.

Case Study
Case studies or Case Reports are sometimes clinical in nature, and are used to report an unusual disease presentation, a new treatment, an unexpected drug interaction, a new diagnostic method, or a difficult diagnosis. The goal of a case study is to bring awareness to previously undocumented phenomena.

Theoretical Article
Like review articles, theoretical articles do not contain original empirical research, but use existing research to present a new theory, concept, framework, or model. These article are peer-reviewed but do not normally contain research or present experimental data.

Clinical Study
This type of article includes Control Studies, Clinical Trials, Randomised Control Trials, and Cohort Studies, and is often specific to medical literature. Clinical studies are rigorously peer-reviewed, subject to ethical guidelines, and often follow standardised reporting procedures.

Methods Article
These types of articles present a new method, test, or procedure that is often experimental. The method described may either be completely new, or may offer a better version of an existing method.

The Search Plan
At this stage, it is a good idea to decide which on sources to search. The sources searched may include the same ones you used in your initial scoping search that we discussed earlier in Scoping Your Subject, but the search in this case is likely to be more extensive, systematic and rigorous than the scoping search. You may also need to use resources outside those of your own institution, using Inter Library Loan to obtain research articles from journals not subscribed to locally for example, or visiting other UK university libraries via the SCONUL Access Scheme. Your search plan is likely to underpin most of the research to follow, so it is worth spending a bit of time to get it right. It can also become the basis for writing up your literature review methodology.
Using psychology as an example, a preliminary plan of the sources you plan to search might look something like this;

<table>
<thead>
<tr>
<th>Source</th>
<th>Dates Covered</th>
<th>Date of Search</th>
<th>Number of Results</th>
<th>Results Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Scholar</td>
<td>2014- onwards</td>
<td>14/01/2017</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td>PsycInfo</td>
<td>1950 onwards</td>
<td>16/01/2017</td>
<td>55</td>
<td>20</td>
</tr>
<tr>
<td>Psychology &amp; Behavioural Sciences</td>
<td>1950 onwards</td>
<td>16/02/2017</td>
<td>48</td>
<td>18</td>
</tr>
<tr>
<td>ASSIA Applied Social Sciences Index and Abstracts</td>
<td>1987 onwards</td>
<td>20/01/2017</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Sociological Abstracts</td>
<td>1952 onwards</td>
<td>20/01/2017</td>
<td>73</td>
<td></td>
</tr>
</tbody>
</table>

References and Further Reading


Using Boolean operators will help you to search more effectively. Depending on which Boolean operators you use, and how you phrase your search query you can narrow down your search results by removing unwanted information, or increase them by including more relevant results. Below are a few useful examples of Boolean operators that work with almost all databases and search engines.

**Use AND to limit search results:** For example: *Migration AND Pattern AND Scotland* to find instances where these three words appear together on the page, but will ignore results where only one, or two search terms is present.

**Use NEAR to narrow results even further:** The NEAR operator is used for results where the search terms appear in the same sentence or paragraph of the document. For example *Pattern Recognition NEAR Protein Structure* will yield any instances where those two words appear in the same sentence or paragraph.

**Use OR to increase search results:** For example *Juvenile OR Delinquent OR Youth OR Teen* will yield any instances of these terms in one set of results. Using OR is a good way to increase your search results using synonyms.

**Use a minus sign, or NOT, to ignore search terms:** For example *Conservation -Marine* to remove all results containing the word *Marine*. Sometimes it might be written *Conservation NOT Marine* or depending on the search engine sometimes *Conservation AND NOT Marine*. This is a good way to remove recurring irrelevant results from your search.

**Use an asterisk to truncate terms:** For example *Bio* will search for the words Biology, Biotechnology, Biosphere, Biologist etc.

**Use a wildcard (*) or ! or ?) to search for multiple spellings:** For example *organ?ation* will find instances with the words organisation, and organization. This is useful where British and American spellings differ. Different search engines will use different symbols as wildcards.

**Use quotations to narrow your search by looking for an exact phrase:** For example “Endocrine Signalling Molecules” to find instances of that exact phrasing.

**Use parentheses to nest queries together:** For example *(Feline OR Cat) AND (Integrative OR Alternative OR Holistic)* allows you to use more than one Boolean operator and reduces the number of times you need to run a search.

**Use field searching to get specific:** For example *Author: Jung, Carl* will find works by that person, as opposed to works about that person. Other fields common search engines use include *Title, Subject,* and *Year.*

When using Boolean searches, it can be useful to keep a record of each query, as this will help you to avoid reproducing searches unnecessarily, and also identify which search terms are more successful.
Using the search terms we identified in Chapter 3, here is an example of what a search query might look like when used with Boolean operators.

<table>
<thead>
<tr>
<th>Impact</th>
<th>“Models of Tourism”</th>
<th>“Quality of Life”</th>
<th>Resident*</th>
<th>Goa</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td></td>
<td>OR</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td>Evaluat*</td>
<td>OR</td>
<td>“World Happiness Report”</td>
<td>OR</td>
<td>“Chorao Island”</td>
</tr>
<tr>
<td>OR</td>
<td>“Models of Tourism”</td>
<td>“Social Capital”</td>
<td>OR</td>
<td>India</td>
</tr>
<tr>
<td>Consequence</td>
<td>OR</td>
<td>Travel</td>
<td>OR</td>
<td>“Arabian Sea”</td>
</tr>
<tr>
<td>OR</td>
<td>Pilgrimage</td>
<td>Health</td>
<td>OR</td>
<td>“Madei Wildlife Sanctuary”</td>
</tr>
<tr>
<td>Cause</td>
<td>Journey</td>
<td>Fulfilment</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td>AND</td>
<td>OR</td>
<td>Safety</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>Employment</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>(Author: Eagles, Paul)</td>
<td>“Economic Development”</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>Ecotourism</td>
<td></td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>“Health Tourism”</td>
<td></td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>“Adventure Tourism”</td>
<td></td>
<td>OR</td>
<td>OR</td>
</tr>
</tbody>
</table>

Written out for use in the search box of a database it might look like this;

(Impact OR Evaluat* OR Consequence OR Cause) AND (“Models of Tourism” OR Touris* OR Travel OR Pilgrimage OR Journey OR Sightseeing OR Safari OR (Author: Eagles, Paul) OR Ecotourism OR “Health Tourism” OR “Adventure Tourism) AND (“Quality of Life” OR “World Happiness Report” OR “Social Capital” OR Health OR Fulfilment OR Safety OR Employment OR “Economic Development”) AND (Resident* OR Citizen OR Inhabitant OR Native OR Local OR Workers) AND (Goa OR “Chorao Island” OR India OR “Arabian Sea” OR “Madei Wildlife Sanctuary”)

As a structured query the above performs an amazing 1.6 million possible search permutations. It is also easy to copy and paste into different databases and search engines for search reproducibility.

References and Further Reading


Experiment: Search Methods

Citation Searching
Citation searching explores the genealogy of theories and publications. It works by following information backwards by exploring the citations used in an article, and following the information forwards by discovering where the article has in turn been cited. It is useful for exploring the interrelationships between ideas, following a theory back to its source, and mapping trends in research areas, among others. Some services only list citations from academic peer-reviewed sources, while others track mentions in tweets, blogs, and newspapers.

<table>
<thead>
<tr>
<th>Resources</th>
<th>Access citation indexes including:</th>
</tr>
</thead>
</table>
| Web of Science     | • Journal Citation Reports  
|                    | • Essential Science Indicators  
|                    | • Arts and Humanities Citation Index  
|                    | • Science Citation Index  
|                    | • Social Science Citation Index  
|                    | • And others                                                               |
| Google Scholar     | Search 10% of the academic web. Information includes ‘Cited by’ though this may be an incomplete figure.               |
| Altmetrics.com     | The Altmetric Bookmarklet lets you instantly see the Altmetric data for any publication with a DOI, including informal sources such as Twitter, blogs, and the media. |
| Oxford Journals    | Includes some metric information for individual journal articles, including citing information.                           |
| ScienceDirect      | Includes some information for individual journal articles, including citing information. However the ‘citing articles’ list is only drawn from full-text content Edinburgh Napier University has subscribed to. |
| SCImago            | Includes journal and country scientific indicators - the SJR indicator gives different values to citations depending on the prestige of the journal they come from. |

Hand Searching
You aren’t guaranteed to find all the information relevant to your topic through searching a database or databases. Some journals aren’t indexed or abstracted, or are indexed incorrectly, while other topical articles might be published outwith your discipline. Hand searching is way of checking both online and print materials for references to information you may have previously missed. For systematic reviews in health disciplines hand searching is an important step. For less-rigorous literature reviews however, a simple scan of the reference lists of journal articles you have found may be enough.

Google Scholar
If items cannot be found with Library search; Google Scholar is a good search resource. Some items not retrievable from Edinburgh Napier University can be found in full online using this resource. By adjusting the settings on Google Scholar you can also identify if an item is within our stock. It is worth keeping in mind that Google Scholar only searches 10% of the academic web, and will not retrieve everything. It is always best to use LibrarySearch before alternative online resources.
Alerts

One of the most important things you need to do is keep up to date with what is happening in your field. Unfortunately, a literature review can often be out of date before you have started your main research! Setting up some alerts will help you to track newly published articles or new Library books, and find out what is happening in your areas of interest. Most search alerts are quick and easy to set up and they will save time in the end, delivering updates such as journal table of contents or automatically running database searches for you. As you narrow down your research topic, you can easily amend your alerts to suit your topic.

References and Further Reading


Before you can begin to write about your research findings, you will need some way to keep track of them. If you are working on a large literature review, memorising the details of thirty or more articles, books, and reports is an impossible task – and an unnecessary waste of your time.

**Data Extraction Table**

Using a Data Extraction Table is a tried and tested method for keeping on top of literature and recording your thoughts, observations, and any critical evaluations. The table helps you to organise your notes in a format that is easy to translate directly into your draft literature review chapter. This approach helps you to identify themes you want to write about first so that you can read with more purpose and distil from the articles only what you need.

Your table can include as many tables or rows as you need. Consider the following example from Inger Mewburn:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons for undertaking a higher degree</td>
<td>Argues that this varies by discipline</td>
<td>Argues that there is a clear gender division in the discipline enrolments - but older people less so.</td>
<td>Doesn’t mention this – many people don’t actually. Is this a problem with the literature?</td>
</tr>
<tr>
<td>Completion rates.</td>
<td>Shows that men drop out more than women in almost all disciplines.</td>
<td>Shows that older people who are enrolled part time are more persistent than those who enrol part time</td>
<td>Shows that attrition varies by institution and that the ‘richer’ institutions lose less students</td>
</tr>
<tr>
<td>Social learning in student communities</td>
<td>Doesn’t mention this</td>
<td>Shows examples of conversations to show that older people have more complex discussions about ‘meta’ issues in study than younger students</td>
<td>Suggests the community in richer institutions is better than that in poorer institutions.</td>
</tr>
<tr>
<td>Relationships with supervisor - how important is it?</td>
<td>Argues that the relationship with supervisor is a key determinant of success</td>
<td>Argues that older people deal with poor supervision better than younger people</td>
<td>Suggests that poorer institutions have a ‘younger’ supervisor profile</td>
</tr>
</tbody>
</table>
If we were to take the above and quickly turn it into paragraphs for a literature review, it might look something like this;

“We can better understand problems like attrition if we know why people choose to undertake a course of study in the first place, however scholars do not pay attention to the reasons why students are motivated to enroll. Two notable exceptions are Humbug et al (2009) and Mewburn (2012). Leslie et al noted that different disciplines report very different reasons for beginning a course of study. Mewburn further developed this work in her studies of older students, claiming that gender further complicated the picture of motivation.”

“Does supervision play a role in student attrition? There is no clear evidence one way or the other, although many scholars claim it is crucial. Leslie et al (2009), who surveyed students about their PhD experience, argues that the relationship with the supervisor is a key determinant in the decision to leave PhD study, whereas Mewburn (2012) argues that older students are better able to deal with poor supervision. The culture of supervision in a faculty or Academic Unit and even its wealth (Holgerd, 2013) might impact on the attrition patterns of students.”

You can make your table as long or as short as needed and include columns for the information you are seeking as part of your research project. This is also an excellent way to keep track of the search queries, keywords, and databases you have used so far. If you are planning to use statistical software, you can code your data extraction tale to make for computer analysis easier later on.

**Bibliographic Management**

Alternatively Bibliographic Management Software or Reference Management Software, such as EndNote, Mendeley, or Zotero for example, is another way to organise your findings. For a large-scale project (a doctoral thesis for example) some kind of reference management is essential. The advantage of programmes such as these is that your information is backed up in the cloud. Most bibliographic managers also allow for sharing of references, and collaboration on projects.

**References and Further Reading**


Evaluate: Your Findings

Critical Evaluation

Critical appraisal in some subjects is often carried out using checklists or rigorous reporting guidelines that help signpost areas to look for when reading a paper. Have a discussion with your supervisor and colleagues about the methods they use for appraising papers, but find a technique that suits your own learning style.

Critical evaluation is not the same criticising or being negative. It is the process of evaluating the intellectual significance of a piece of information, as well as the strengths and limitations of the existing knowledge in a given field of research. As you uncover more research and become familiar with your subject matter, the process of critical evaluation will in turn become easier.

When critically evaluating a piece of information, look for arguments rather than facts.

The Five C’s of Evaluation

- **Cite**: Keep the primary focus on the literature.
- **Compare**: the various arguments, theories, methodologies, approaches expressed in the literature. What do the authors agree on? Who employs similar approaches?
- **Contrast**: the various arguments, themes, methodologies approaches and controversies expressed in the literature. What are the major areas of disagreement, controversy, debate?
- **Critique**: the literature: which arguments are most persuasive, and why? Which approaches, findings, methodologies seem most reliable, valid or appropriate, and why?
- **Connect**: the literature to your own area of research and investigation.

These observations will form the bases of your written review.

Methods of Evaluation

The way in which you choose to evaluate a piece of research largely depends on the type of literature and your purpose. Evaluative tools exist to help researchers to critique qualitative analyses, or systematic reviews, for example. If you’re unsure of where to start, begin with something simple, like the Information Quality Scorecard, or the Critical Synopsis Worksheet. Both involve answering five broad questions about the piece of research you are reading. Some more advanced evaluative tools are:

- [10 Questions for Critical Analysis by Wallace & Wray](#)
- [Qualitative Research Evaluation Worksheet](#)
- [Systematic Review Evaluation Worksheet](#)
- [Evaluation Tool for Quantitative Research Studies](#)

Other helpful resources for in-depth evaluation can be found on the [Critical Appraisal Skills Programme](#), and the [Scottish Intercollegiate Guidelines Network](#).
Reliability on the Internet

Domain
The domain name of the website is a good indicator of its reliability. Different top-level domains indicate different types of websites.

- **.org** usually denotes that the website is owned by a non-profit organisation
- **.com** usually indicates a commercial website, as does **.co.uk**
- **.ac** and **.ac.uk** are reserved for schools, colleges and universities
- **.gov.uk** is reserved for government websites
- **.scot** is used for websites specifically about Scotland and Scottish culture

Provenance
Consider who the author or publisher of the information is, and what qualifies them to write about this particular topic. Is the publication information (including the author’s name, date and place of publication) clearly visible, or has it been omitted? Using a domain search service such as alexa.com or who.is can reveal a lot about who owns the webpage, such as contact information, as well as statistical information such as how many visits the website receives, for example.

Is it Current?
The internet has been widely used since the 1980s, meaning that information you uncover as part of your research may be decades out of date. Look for a publication date, either on the webpage itself, or in the page’s source code. If a publication date isn’t visible, clues like broken links might indicate that it is out of date.

Accuracy and Objectivity
Lecturers check assignments for appropriate references, so why not do the same when evaluation websites and webpages? When evaluating online resources, check for factual information, statistics, citations and references. Compare this information with previous results for accuracy. Also be aware of conflicts of interest when evaluation information online. When evaluating a news article for example, has it been published under News or Opinion? Also be aware of ‘sponsored features’ printed in newspapers, which are advertisements that look and read like new articles.

Online Evaluation Tools

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<tr>
<td>When trying to gain a greater understanding about a website as whole, knowing who owns and operates the site can be helpful. A WHOIS search will reveal who owns the website, how long they have owned it, and their contact details.</td>
<td></td>
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</table>

<table>
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<tr>
<th><strong>Alexa</strong></th>
<th><a href="http://alexa.com">http://alexa.com</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing how much ‘traffic’ a website receives is also very useful. The website Alexa estimates visitor numbers for any website, will tell you how many people are linking back to that website and in some cases demographic information about the sites visitors.</td>
<td></td>
</tr>
</tbody>
</table>

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<tr>
<th><strong>The Wayback Machine</strong></th>
<th><a href="http://archive.org">http://archive.org</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the Wayback Machine, Archive.org provides a snapshot of what a webpage looks like over time. Accessing the cache for a website lets you see its contents at different times in the past, in some cases as far back as when it was first published.</td>
<td></td>
</tr>
</tbody>
</table>
References and Further Reading


O'Hara, Hazel. (2014). Writing a literature review. Edinburgh: Queen Margaret University. Available at: http://www.qmu.ac.uk/els/docs/LIT%20REVIEW%202014.pdf


Once you have collected and evaluated the literature it is time to discuss your findings. The purpose of a literature review is to describe the current body of knowledge, to describe the quality of that information, explain research findings, and to support the need for additional research.

Describe the Current Body of Knowledge

Once you've gathered all your research, it's time to think about how to structure it in your review. Depending on the type of review you have chosen to undertake there are several ways to do this. Whatever structure you choose, if you have organised your findings into a Data Extraction Table, you will find that incredibly useful at this stage.

Chronological
With this approach your aim is to provide an overview, history or chronology of the literature that you have selected for inclusion in your review. A chronological review traces the evolution of a theory, discipline, or concept through the literature.

Example of a chronological review

Thematic
You might find that the information you uncover as part of your research can be grouped thematically. In any specific area of study it is possible to identify patterns of research and so you can structure your writing around these. You can use different headings to give an overview of the relevant literature for your research project.

Example of thematic review

Cross-Disciplinary
Here you provide a cross-disciplinary framework where studies within a particular discipline are discussed together. This is particularly useful for research projects that focus on qualitative studies as these can draw from many different areas of research.

Example of a cross-disciplinary review

Theoretical
Theoretical reviews are not always objective. They are an assessment of literature using a theoretical framework as the criteria for evaluation. Information is assessed in terms of its relevance to the theory being discussed. You might find this type of review useful if your research project draws on a non-traditional viewpoint. Reviews conducted with critical psychology, social constructionist or psychodynamic approaches are examples of theoretical reviews.

Example of a theoretical review

Describe the Quality of the Information

The literature review takes many forms, so it is important to be aware of the type of review you have been asked to write.
Narrative Literature Review

A narrative review is typical of the traditional literature review. Here you have a broad focus, and may not need to address a specific question. Traditional literature reviews do not necessarily need to adhere to rigorous selection criteria when including research for discussion, and may not need to state the reasons that particular research was chosen to be discussed at all.

Example of a traditional/narrative literature review

Integrative Review

If asked to write an integrative review, you will have to review, critique, and synthesise literature on a topic in an integrated way to provide a more comprehensive understanding of a particular topic. Integrative reviews summarise past theoretical and empirical literature and sometimes attempt to generate new frameworks and perspectives on that topic. The benefit of an integrative review is that you may not need to use explicitly systematic approaches when searching or analysing information. This means they are quicker to complete when compared to comprehensive reviews. However there is a potential for bias here due to lack of rigour.

Example of an integrative review

Systematic Review

A review of research literature using a systematic, explicit, accountable and documented methodology. Its purpose is to evaluate all research evidence relevant to a particular question. In conducting a systematic review you should use systematic methods to answer a question or set of questions, and describe every step of the research process used. In most systematic reviews a second researcher, or a team of researchers should also identify and critically appraise results, to arriving at the same conclusions as you. This approach takes 12 months or longer and is widely used in the field of medicine and health science. There are established methodologies for conducting systematic reviews and some examples include;

- Cochrane Library Method
- PRISMA
- Centre for Reviews and Dissemination Method
- RAMESES Standards
- Bayesian Methods

Meta-Analysis

A meta-analysis is the statistical analysis of the results of a systematic review. The idea being that the larger the sample size (the number of studies included) the more accurate the results. The benefit of this method is that it summarises numerous findings and investigates consistency across different samples. Meta-analysis is often used in observational and interventional studies and is suited to disciplines that favour these methods.

Example of a meta-analysis

Explain Research Findings

Evidencing your reasoning is a crucial part of any literature review. Some types of review (PRISMA for example) have explicit guidelines for how to do this. Other types of review (such as traditional narrative review) aren’t so prescriptive.
Clearly state the intention
Begin with the reason for conducting your literature search at the very beginning of your review and refer to it again in your conclusion. Above all else, the person reading your work needs to know why they are reading it!

Consider the underlying structure, logic and pace of your writing
Any good piece of writing begins with structure. Each paragraph you write in your review should draw directly from the evidence in small amounts so as not to overwhelm the reader. Pacing and logic are also equally important. Introduce each piece of evidence, expand and clarify your point, and then briefly summarise. In this way your paragraphs should gradually build towards an evidenced conclusion.

Use appropriate language
Be aware of the different style guides used in your discipline. Your review should be written in a formal academic or scientific style, avoiding personal language. Style guides set out standards for all areas of academic research and writing including appropriate methods, grammar, charts and illustrations, referencing, and publication. For example, the Publication Manual of the American Psychological Association, 6th edition covers all aspects of research in the behavioural sciences, but is also widely used in the social sciences and the humanities. Other examples of style guides include the Chicago Manual of Style, 16th edition, and its technical counterpart the IEEE Editorial Style Manual.

Support the need for additional research
If your literature review is part of a dissertation or thesis, you will need to show that you have identified a gap in the current body of knowledge, which your own research will attempt to investigate. In the case of a dissertation chapter, your literature review is there to inform your research strategy and your discussion of methodology. This should follow on smoothly from the conclusion of your review.

References and Further Reading


Reference: Correctly

Referencing your work correctly is a crucial part of conducting a research project. Now that you have finished writing your findings, you will want to make sure that others can trace the sources you have used. This is particularly important in literature reviews, because you are discussing published works and your readers need to be able to identify and locate these themselves. First, let’s get some terminology out of the way.

A **citation** is the name or names and date given in the main text, so that readers can see that information in context.

The **reference** appears as part of a list at the end of your main text, and contains details such as the URL, title of the journal, and other important publication information.

A **reference list** contains all the references cited in your essay.

While a **bibliography** lists all the works you consulted as part of your research, even if you haven’t cited them directly in your essay or assignment.

**Styles and Standards**

Referencing styles are broadly understood and have a basic set of guidelines, and have evolved organically over time. Harvard (or parenthetical, or Author-Date), and Vancouver are both examples of a style. They are interpreted differently by people everywhere. Conversely, referencing standards are developed, edited, and published by official bodies and come with codified and easily identifiable rules. American Psychological Association 6th edition (APA 6th), Oxford University Standard for Citation of Legal Authorities (OSCOLA), Chicago Manual of Style 15th edition (Chicago 15th), and the Blue Book are examples of referencing standards.

Guidelines for referencing practice in the School of Applied Sciences can be found [online here](#). If in doubt refer to your module or programme Leader, your Supervisor, or contact your Lecturer or Subject Librarian for clarification.

**Bibliographic Management**

Bibliographic reference managers are ways to store and organise your reference information and research. If used properly, reference managers can save you time, and make referencing easy and stress-free.

You add papers to your library by importing PDF files stored on your computer, or by retrieving their details from other locations like Library databases such as EBSCO, ScienceDirect, Pubmed or Web of Science for example. If you don’t have access to the full-text PDF of the item you would like to cite, you can add the information manually. Once you have added all your references you can generate a full bibliography with a couple of clicks, which frees up your time to focus on writing your assignment.
### Reference Managers

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>EndNote</strong></td>
<td>EndNote is a reference manager that is available in two versions; EndNote Online – also known as Endnote Basic – which is the free web-based version, and EndNote Desktop which is available on Edinburgh Napier University campus computers.</td>
</tr>
<tr>
<td><a href="https://www.myendnoteweb.com">https://www.myendnoteweb.com</a></td>
<td></td>
</tr>
<tr>
<td><strong>Mendeley</strong></td>
<td>Mendeley is available in two versions; as an online reference manager (Mendeley), and as a desktop-based programme (Mendeley Desktop) that is free to install on any computer.</td>
</tr>
<tr>
<td><a href="https://www.mendeley.com/">https://www.mendeley.com/</a></td>
<td></td>
</tr>
<tr>
<td><strong>Zotero</strong></td>
<td>Zotero is a reference manager that is free, open-source, and can be downloaded as a browser extension for Firefox, Chrome, and Safari as well as a standalone program that works with Windows, Mac, or Linux systems.</td>
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<tr>
<td><a href="https://www.zotero.org/">https://www.zotero.org/</a></td>
<td></td>
</tr>
<tr>
<td><strong>Docear</strong></td>
<td>Docear is an open-source and free reference manager that includes mind-map features and full-text literature searching. It is available as a desktop programme for Windows, Mac, or Linux systems.</td>
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</table>

### References and Further Reading


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