Research and Writing Skills for Academic and Graduate Researchers

RESEARCH AND WRITING SKILLS FOR ACADEMIC AND GRADUATE RESEARCHERS

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CONTENTS

Strategies and Resources for Searching the Literature

Conducting a Systematic Review

Choosing a Reference Manager

Developing an Effective Research Proposal

Writing your Literature Review

Becoming a Research Writer

Publishing a Journal Article

Setting up your Researcher Profile

Are you Being Cited?

ACKNOWLEDGEMENT OF COUNTRY

In Aboriginal and Torres Strait Islander culture it is respectful to formally womin djeka (welcome) people to Aboriginal and Torres Strait Islander country or land. At RMIT we do this with the following acknowledgement:

'Luwaytini' by Mark Cleaver, Palawa.

"We would like to acknowledge Wurundjeri people of the Kulin Nations as the Traditional Owners of the land on which the University stands. We respectfully recognise Elders past and present."

At RMIT we recognise and respect the unique culture and contribution that Aboriginal and Torres Strait Islander people bring to our communities. We are also proud to provide study, cultural, and personal support to our Aboriginal and Torres Strait Islander students in their learning journey. We womin

djeka you to further explore and experience more about Australian Indigenous culture by visiting our Indigenous education centre – Ngarara Willim Centre and interacting with our Aboriginal and Torres Strait Islander staff and students.

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    - Images have text alternatives.
- Information is not conveyed by colour alone.

Other file formats available

In addition to the web version, this book is available in a number of file formats, including:

- **Print PDF:** the format you should select if you plan to make a printed, physical copy of your book. This file meets the requirements of printers and print-on-demand services.
- **Digital PDF:** useful if you want to distribute your book as a digital file, but do not intend to print the file. Digital PDFs are optimized for accessibility, contain hyperlinks for easier navigation, and can be used online.
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If you have problems accessing this resource, please [email us](mailto:) to let us know so we can fix the issue.

VERSIONING HISTORY

This page provides a record of edits and changes made to this text from pre-publication to its latest iteration. Whenever edits or updates are made in the text, we provide a record and description of those changes here.

If you have a correction or recommendation you would like to suggest, please contact the [RMIT University Library Research Services Team](#).

Version	Date	Type
Pre-publication	2017-2022	Graduate Researcher KnowHow
Pre-publication	2018-2022	Research Skills for HDR Candidates
V1	21/09/2022	Research and writing skills for academic and gr researchers
V2	16/12/2022	Research and writing skills for academic and gr researchers
V3	15/02/2023	Research and writing skills for academic and gr researchers
V4	17/05/2023	Research and writing skills for academic and gr researchers
V5	19/05/2023	Research and writing skills for academic and gr researchers

V6	19/07/2023	Research and writing skills for academic and gr researchers
V7	14/08/2023	Research and writing skills for academic and gr researchers
v8	7/12/2023	Research and writing skills for academic and gr researchers

ABOUT THIS BOOK

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RESEARCH AND WRITING SKILLS MODULE HUB

These stand-alone modules on research and writing skills can be completed individually and should take around 30 minutes, maybe a little longer if you do all the exercises. Work through any module systematically, or browse to find relevant material using the contents menu on the left hand side.

Literature searching and managing references

Research writing and study skills

Publishing and metrics

This set of modules is under development –
check back regularly to find additional content.

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STRATEGIES AND RESOURCES FOR SEARCHING THE LITERATURE

Welcome to this online module related to strategies and resources for searching the literature. The module will explore key resources to use when literature searching, and the features of developing an effective search strategy.

Learning objectives

This module will introduce you to:

- strategies and search techniques that can be used in your searches
- how to construct your search query

- selecting key resources to use in your
  searches, such as LibrarySearch, Databases,
  Google Scholar
- staying current with the literature.

There are learning activities throughout this module to help you with some practical searching.

This module should take you about 30 minutes to complete.

Work through each section using the navigation footer (i.e. previous/next), or use the contents menu to select a particular section.

Upon completion, please help us improve this module by taking a moment to complete the feedback form provided at the end.

Photo by Erik Mclean on Unsplash

You may also be interested in viewing the additional resources about Literature searching in the Explore Further chapter at the end of this module. Provided is a webinar

recorded from the Library's 'PhD Up!' program (now called Research Plus) and associated library guides.

BEING CLEAR ABOUT YOUR PURPOSE

The purpose

When considering how and where to start your literature search, it is first worth thinking about why you are looking for information. What is the purpose of your search?

You may be doing a literature search:

- for a research proposal
- for a literature review as part of a thesis or manuscript
- for an assignment in an academic course
- to update your knowledge
- for professional development
- to support a workplace activity.

Determining the reason for your literature search will help you select the types of materials needed. The Library has a wide range of materials available including books, journals, videos, newspapers, images, standards, case studies, theses, and more. This module will introduce you to some of these types of materials. To explore these further go to [Library collections](#).

What is a literature review?

Test your knowledge

https://rmit.pressbooks.pub/ researchwritingmodules/?p=732#h5p-8

There are two main purposes for undertaking a literature review.

1) To show awareness of the present state of knowledge in a particular field, including:

- seminal authors
- the main empirical research
- theoretical positions
- controversies
- breakthroughs as well as links to other related areas of knowledge.

2) To provide a foundation for the author's research. The literature review should:

- help the researcher define a hypothesis or a research question, and how answering the question will contribute to the body of knowledge
- provide a rationale for investigating the problem and the selected methodology
- provide a particular theoretical lens, support the argument, or identify gaps.

This video provides an overview of what a literature review is. Watch this video and answer the question below.

Literature Reviews: An Overview for Graduate Students *(9:39 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/researchwritingmodules/?p=732#oembed-1

"Literature Reviews: An Overview for Graduate Students" by libncsu is licensed under CC BY-NC-SA 3.0

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/
researchwritingmodules/?p=732#h5p-4

Further information and resources on writing your literature
review can be found in the [Learning Lab](#).

PLANNING YOUR SEARCH

A literature search starts with effective planning. A literature search plan can:

Photo by Ussama Azam on Unsplash

- ensure your literature searching is comprehensive
- prompt you to think critically
- guide your searching to focus on your topic
- document your search processes to minimise replication
- save time.

Identify the main or important aspects

It can be helpful to write down your research question and identify the important words that define your topic before searching.

Example

'I am interested in the recycling of waste water in cities.'

The important terms to include for this topic would be:

- **recycling**
- **waste water**
- **cities**

Developing keywords

The next step is to compile a list of synonyms or alternative terms. This will ensure that you will have a comprehensive search for relevant literature.

Consider variations such as:

- synonyms or alternative terms – e.g. climate change, global warming

- acronyms / abbreviations – e.g. DFT, density functional theory
- alternative Spellings – e.g. aluminium, aluminum
- plurals / alternative endings – e.g. environment, environmental.

For our research topic, here is the start of a list of synonyms and alternative terms.

Recycling	Reuse
Waste water	Sewerage
Cities	Urban

Now look to developing your search strategy utilising some different search techniques.

DEVELOPING A SEARCH STRATEGY

There are a number of different search techniques that you can use to develop your search strategy. This chapter explains how to make your searching thorough and effective by using phrase searching, truncation, spelling variations, and Boolean operators.

Phrase searching

To specify that two or more words must appear as a phrase, use double quotes.

Example

"global warming"

Truncation

To search for alternative endings of words, use truncation or stem searching. In most databases, the truncation operator is an asterisk (*).

Example

A search for **environment*** will retrieve:

- environment
- environments
- environmental
- environmentalism

Spelling variations

Sometimes there are slight differences in the spelling of a word, for example, English and American variations. To facilitate searching on alternative spellings, some databases allow

wildcard searching. Wildcards **take the place of one or more characters in a search term**. The wildcard operator is often a question mark (?) or an asterisk (*).

Example

A search for **colo?r** will find:

- color
- colour

Once you have a list of keywords, synonyms, and effective search techniques you will then need to combine these into effective search statements.

Combining with Boolean

Boolean searching can be very helpful when searching databases. It allows you to combine multiple terms with connecting words, called 'Boolean operators'. Most databases use common Boolean operators, such as AND, OR, and

NOT. Here are examples of how you can use Boolean operators to broaden or narrow your search.

AND operator narrows your search

Use AND operator to find records that contain all the terms you use. This is useful if you want to find only those records that mention both terms. Searching for "climate change" AND cereals will locate records with both these terms.

OR operator broadens your search

Use OR operator to find records that contain any of the terms you use. This is useful if you want to allow for alternative terms/synonyms for the same concept. Searching for "climate change" OR "global warming" will locate records with both as well as one of these terms.

NOT

NOT operator narrows your search

Use NOT operator to exclude a term. This is useful if you don't want to find any records that contain a particular term. Use it with care to avoid excluding relevant articles that briefly mention the second term. Searching for "global warming" NOT "fossil fuel" will exclude all records that mention "fossil fuels" as well as "global warming" and "fossil fuels" together.

Watch this video to gain an understanding of how to use Boolean operators.

Boolean Operators (3:02 mins)

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/researchwritingmodules/?p=549#oembed-1

Boolean Operators (3:02 min) by Lexy Spry and Emily Wixson (YouTube)

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=549#h5p-7

THE SEARCH QUERY

To construct the search query consider using some search techniques such as Boolean operators and phrase searching.

In considering the topic **I am interested in the recycling of waste water in cities,** three main aspects were identified, and a list of possible keywords (search terms) was compiled.

The search statement may look like the following:

Example

(recycling OR reuse) AND ("waste water" OR

sewerage OR "drain water") AND (cities OR urban)

This search query has used:

- double quote marks enclosed around keywords that contain two words so they are searched as a phrase
- Boolean operator OR is used to combine keywords about the same aspect
- Boolean operator AND is used to combine keywords about different aspects.

The search features of library databases make constructing your search query easier, especially when using advanced search options. For example, the Boolean operators can usually be selected from a drop-down menu. This is evident in the example below, showing the search query where the Boolean operators of AND are selected.

Note: nearly all databases have these features, but they might look different. You may need to explore to find the options you need.

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Activity

Now it's your turn to develop your search query for your own research topic.

1. Write down your research topic and identify your main aspects.
2. For each aspect list some alternative search terms (synonyms).

3. Consider some different search techniques that you may need to use.
4. Create a search query that combines your topic keywords and synonyms using Boolean operators AND and OR.

REFINING YOUR SEARCH

After developing your search query and executing your search, you now need to look at the search results and determine whether you have been successful in locating the desired literature. Maybe you need to refine your search further. Outlined below is information about using the databases fields or the subject headings to return more accurate search results. The limits options of the database are also another way to refine your search results.

Photo by Shyam on Unsplash

Field searching

It is the advanced search option in a database that provides

searching by a particular field. If the search terms appear in the title or subject of the reference, then it is likely to be more relevant.

> References in a database are indexed by different fields, for example:
>
> - Author
> - Title
> - Journal name
> - Subject.

Subject headings

Some databases will have subject headings, or descriptors, that are assigned to the reference when it is indexed in the database. The subject headings are used to describe the content of the reference. This list of subject headings is called a thesaurus. The thesaurus may have an elaborate structure of broader, narrower, and related terms, which will help you to search very precisely. Check the database's help for information about searching by subject headings.

Limits

Many databases will give you the option to limit your results. Look for the different limit options in the database when you are getting too many results.

For example, you may be able to specify that you want to retrieve by:

- Material format (e.g. peer-reviewed journals)
- Publication date (e.g. last five years)
- Language (e.g. English only)

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=737#h5p-9

SELECTING RESOURCES TO SEARCH

Library subject guides

The Library's subject guides are good starting points for research. They list relevant databases and other resources relevant for different subject areas.

Watch this video for a brief introduction to '*What's a Library Subject Guide?*'

What's a Library Subject Guide? (1:13 mins)

📽 *One or more interactive elements has been excluded from this version of the text. You can view them online here:*
https://rmit.pressbooks.pub/ researchwritingmodules/?p=102#oembed-1

What's a Library Subject Guide? (1:12 mins) by RMIT University (YouTube)

The following image shows how to locate Subject Guides from the [Library homepage](#).

Find books, articles and more

Library Search   Databases   Google Scholar   Research Repository   **Not sure where to start?**

Library subject guides

Need help getting started with your research? These guides highlight the variety of resources you can access, including databases, e-journals, e-books and websites.

Select your study area:

- Architecture and Urban Design
- Business and Law
- Engineering
- Property, Construction and Project Management

- Art
- Design
- Fashion and Textiles
- Science

- Biomedical, Health and Nursing
- Education
- Media and Communications
- Social Sciences and Languages

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Topic-specific guides

Explore topic-specific guides such as:

- [Industry information](#)
- [Company information](#)
- [Standards](#)
- [EndNote: a beginner's guide](#)

Research guides

There is also a range of [Research guides](#) that include:

- Altmetrics
- Finding and obtaining theses
- HDR students
- Research Data Management
- Research Metrics
- Researcher Profiles and ORCID iDs
- Starting your literature review
- Staying current with your research
- Strategic Publishing
- Systematic Reviews.

Photo by David Clode on Unsplash

Activity

1. Go to the Library homepage and find a subject guide relevant to your research area.
2. Does that subject guide list any databases that might be useful for your research topic?

USING SEARCH ENGINES

Google and Google Scholar

Many people begin their research with Google, and sometimes Google Scholar. Google can be useful to get an overview, background information, or to define terms. We all Google – but are you doing it effectively?

Photo by Mitchell Luo on Unsplash

Using Advanced Google or Google Scholar improves your chance of obtaining relevant information. Researchers are expected to use scholarly information and Google alone is insufficient.

Google Advanced lets you choose combinations of words – e.g. all these words, exact phrase or word etc., and narrow results by language, region, last update, site or domain, file type, etc.

The following table provides a comparison of the difference in features between Google and Google Scholar.

Google vs. Google Scholar

Features	Google	Google Scholar
Easy to search interface	Yes	Yes
Coverage	Many sources, good definitions, background information, government/company reports, but uncontrolled content.	Indexes scholarly sources, but with uneven discipline content.
Format	Varied, news, company reports, trade and government publications, grey literature.	Scholarly material, articles, conference papers, book chapters, patents.
Search results with basic filtering	Yes, with Advanced Google.	Limited
Search alerts	No	Yes
Search metrics	No	Yes
Author profiles	No	Yes
Full-text access	Yes, depending on sources.	Yes, but payment may be required.
Export citations to reference managers	No	Yes

Best Practice Tip

Sign in to Google Scholar via the Library webpage to access full text that RMIT holds in linked databases.

See the image below for where to find Google Scholar on the RMIT Library homepage.

Find books, articles and more

Library Search   Databases   **Google Scholar**   Research Repository   Not sure where to start?

Google Scholar

Google Scholar search results include resources from our Library's online collections.

Access via the Library >	Direct access >	Access information and tips >
Easy access to full text articles from our Library collections. If accessing off-campus, you will need to log in with your RMIT password.	With access to personal Google account that allows exporting citations to EndNote and other bibliographic management tools.	We explain the two access options in more detail, give you some tips on how to interpret search results and what to do when there are access issues.

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Activity

Search [Google Scholar](#) using some of your search query keywords.

As you search make note of the following:

1. The different types of resources in your results list
2. Can you follow a link to the full text of the article or resource?
3. Look for where to refine your search by date or relevance, and also where you can include (or exclude) patents and citations

There are also further tools in Google Scholar to find related material. These are located under each of the titles listed in your search results.

Can you find the Cite, Cited by, Related articles, and Save links?

See if you can also find where to save an alert for your search.

Saving an alert will provide an email feed for any new papers on your topic, as they are added to Google Scholar.

Test your knowledge

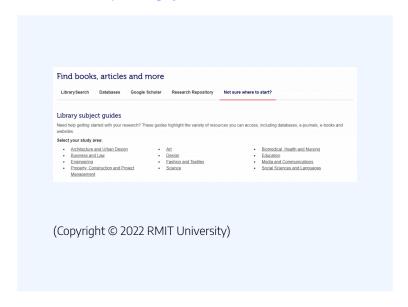An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=149#h5p-5

LibrarySearch

LibrarySearch is RMIT University Library's search engine and an important place to continue your literature search.

You can use LibrarySearch to retrieve a wide variety of materials:

- Books and E-books
- Journal and newspaper articles
- DVDs and streaming video
- Theses and more

Make sure to log in to LibrarySearch as some resources are only available when you log in. Look for the 'Log in for full access' button on the [Library's homepage](#)

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Watch this video for a brief introduction to LibrarySearch
What is LibrarySearch? *(1:07 mins)*

One or more interactive elements has been

excluded from this version of the text. You can view them online here: https://rmit.pressbooks.pub/researchwritingmodules/?p=149#oembed-1

What is LibrarySearch? (1:07 mins) by RMIT University (YouTube)

LibrarySearch is particularly good for:

- Getting an overview of the Library's physical and online collections
- Finding "something" on a topic
- The refine features to narrow your search results

There are refine options in the menu on the left, including:

- Peer-reviewed articles, full text online
- Resource type – articles, books, etc.
- Subject
- Date range

To access full text for online material e.g. e-books or journal articles, you click on the 'View Online' link at the item record.

LibrarySearch does not provide even coverage of the subject area. Specialised subject databases in business, architecture, psychology, legal, and fashion are not covered by LibrarySearch.

As a researcher, you will also need to search specialist library databases. We will be looking at these databases later in this module.

Activity

Go to LibrarySearch on the Library homepage and search using keywords for your own research topic.

Locate a peer-reviewed article on your topic and access the full text.

Research Repository / Theses

The RMIT Research Repository is an open-access institutional repository providing free, searchable access to research publications authored by RMIT University staff and students.

Most theses submitted at RMIT University can be found in the RMIT Research Repository.

Theses can be invaluable sources for in-depth and significant research related to your field of study. The RMIT Finding and obtaining theses research guide is a great starting point for resources that will allow you to access Australian and international theses.

Activity

- Search the RMIT Research Repository
- Enter your search term, for example, climate change

- Limit your search results to 'Dissertations & Theses'
- The 'Refine your results' enables further selection of:

    ◦ Resource type
    ◦ Research unit
    ◦ Author

- Identify a relevant thesis to your topic

SEARCHING LIBRARY DATABASES

Databases

While Google Scholar and LibrarySearch can provide good starting places, you will need to move beyond these to comprehensively retrieve relevant literature.

Databases are excellent tools for researching journal articles, as well as other scholarly content. They often have a specialised focus – for example, by subject, resource type, or geography. You can explore the [different types of databases](#) on offer from the Librarythat include videos, images, theses, standards, and more.

There are many databases available, some of which are subject-specific. To locate databases relevant to your research area you can consult the Library's [subject guides.](#)

To access the list of popular databases, select the Databases tab in the 'Find books, articles and more' or the Library's homepage.

Find books, articles and more

Library Search   **Databases**   Google Scholar   Research Repository   Not sure where to start?

Popular databases

- Australian Standards
- IBISWorld
- PubMed

- EBSCOhost Web
- LinkedIn Learning
- Scopus

- Euromonitor Passport
- ProQuest Central
- Web of Science

(All databases) (Find journals) (Collections) (Online access troubleshooting)

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Watch this video for a brief introduction to Library databases.

What's a library database? (1:56 mins)

One or more interactive elements has been excluded from this version of the text. You can view them online here:
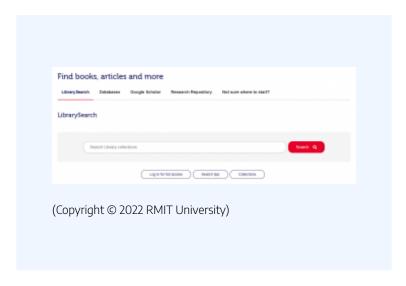
https://rmit.pressbooks.pub/researchwritingmodules/?p=108#oembed-1

What's a library database? (1:56 mins) by RMIT University (YouTube)

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=108#h5p-6

Searching databases

The search results in databases can be sorted and filtered in a variety of ways – for example, by the level of content (scholarly, peer-reviewed).

A large database that covers a range of subject areas including business, science, health, and social sciences is ProQuest.

Finding the full article

Databases will often give you direct access to the full text online, but if you cannot see a link to the online article, try the 'Find it' button link. This will open a new browser window that will search all databases to which RMIT University Library has access.

If not held at RMIT

If you cannot find the article online it may be available in print, or you can request the article via the Library's [Document Delivery Service](#).

Watch this video to learn how to do an advanced search in the ProQuest database.

ProQuest Advanced Search *(2:14 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=108#oembed-2

[ProQuest Advanced Search](#) (2:14 mins) by ProQuest ([YouTube](#))

Activity

The activity uses the ProQuest database. You may wish to practice searching one of the databases you selected earlier, from your subject guide.

1. Go to the Library homepage and select the Databases link.
2. Select ProQuest Central from the 'Popular databases' list.
3. Note the Basic and Advanced Search options. Select Advanced Search.
4. Search the database using your search query keywords and try to use a simple Boolean search e.g. (waste water OR effluent) AND (recycling AND cities).
5. Next to the search box from the drop-down menu select 'Anywhere except full text'. Also, select options to limit to peer-reviewed articles and publication date of 'Last 3 years'.

6. Note options for Source/Document type.
7. Select search.

Citation databases

Scopus and Web of Science are two large citation databases that can be important starting points for subject areas, particularly in the sciences.

These databases also display citation data that enables you to track the development of a research idea forward through time.

Further information on searching these is below.

Watch this video to learn how to do a basic search in the Scopus database.

Scopus Tutorial: How to Conduct a Basic Search *(2:57 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:

https://rmit.pressbooks.pub/
researchwritingmodules/?p=108#oembed-3

Scopus Tutorial: How to Conduct a Basics Search (2:57 mins) by Scopus (YouTube)

Watch this video to learn how to do a search in the Web of Science database.

Web of Science: Search Tips *(5:38 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:

https://rmit.pressbooks.pub/
researchwritingmodules/?p=108#oembed-4

Web of Science: Search Tips (5:38 mins) by Web of Science (YouTube)

STAYING CURRENT WITH THE LITERATURE

Another useful feature of different databases includes the ability to set up 'search alerts', which allows you to receive alerts of new articles that meet your search criteria. This is an excellent way to keep up-to-date with your research.

It is also possible to set up alerts for:

- The latest tables of contents for specific relevant journals.
- Citation alerts whenever a particular article is cited by someone.
- Upcoming conferences and calls for papers.
- Websites, social media, and Google.

See the library guide to [Staying current with your research](#) for more details and examples.

Conferences

Conferences are an important part of staying current with intellectual and academic developments and discussions. There are diverse websites that will alert you of upcoming conferences. Papers are

Rice University Stock Photography by Ed Schipul (CC-BY-3.0)

sometimes available via conference websites or accessible via databases.

The Staying Current With Your Research Library Guide lists a number of conference directories.

EXPLORE FURTHER

Congratulations on completing this module. We have explored the purpose of a literature review, some of the key resources for searching the literature, and some aspects of developing a search strategy.

Photo by Joseph Chan on Unsplash

The module also included information on staying current with new literature published in the area and searching for theses and conferences.

Further assistance

For more assistance in researching your literature review contact the Library by submitting a research request form.

Additional information and resources are available in the guides:

- Literature reviews
- Alerts: staying current with the literature
- Theses

Information and resources on writing your literature review can be found in the [Learning Lab](#).

Learn more

You may also be interested in viewing the following webinar [Strategies and resources for searching the literature (64 mins.)](#) recorded from the Library's PhD Up! program (now called Research Plus). The webinar content complements this online module.

Feedback

Your comments and suggestions on how we can improve this module will be appreciated. Please complete our [feedback form](#).

What's next?

You have completed this module on Strategies and Resources for Searching the Literature. You can [return to the Research and Writing Hub](#) to choose another module to complete.

CONDUCTING A SYSTEMATIC REVIEW

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Welcome to this online module on how to conduct a systematic review. The module provides an overview of the key components and the process you need to follow when conducting a systematic review. Briefly covered are developing the research question and the protocol, aspects of searching, performing the analysis, and reporting findings.

Learning objectives

The module will help you:

- understand what a systematic review is
- know the difference between a systematic review and a literature review
- know the various steps involved in conducting a systematic review
- develop your research question and protocol
- learn about resources and strategies when searching the literature
- to understand the selection and evaluation processes of the included studies.

The course materials include information, videos, and learning activities that explore key features of conducting a systematic review.

This module should take you about 30 minutes to complete.

Work through each section using the navigation footer

(i.e. previous/next), or use the contents menu to select a particular section.

Upon completion, please help us improve this module by taking a moment to complete the feedback form provided at the end.

You may also be interested in viewing the additional resources about Systematic Reviews in the Explore Further chapter at the end of this module. Provided is a webinar recorded from the Library's 'PhD Up!' program (now called Research Plus), a short video introducing systematic reviews, and the associated library guide.

Please note that the examples used in this module are related to the discipline of health sciences, but the principles of this research methodology may be applied to other areas.

ABOUT SYSTEMATIC REVIEWS

A systematic review is a secondary research method that identifies and evaluates evidence from existing data in primary research studies.

Commonly, systematic reviews are used in healthcare research to assess the evidence on whether a medical intervention is effective in treating a certain condition.

Photo by José Ignacio González Pansiera on Unsplash

effective in treating a certain condition.

Definition

As defined by the Cochrane Collaboration a systematic review is:

"A review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyse and summarise the results of the included studies."

Features of a systematic review

A systematic review has these key features:

1. It addresses a **research question** that is clearly defined and specific.
2. It follows a **rigorous methodology** by adopting a clearly **pre-defined protocol**.
3. It is an **exhaustive search** of the literature that is carried out in accordance with the protocol.
4. All evidence is considered and only excluded if it does not meet the **eligibility criteria**.

5. The included studies are **critically analysed**, especially for the risk of bias.
6. It ideally involves **more than one person**.

For HDR candidates

A PhD or a Masters by Research thesis will include a chapter devoted to a review of the literature. This type of review is known as a traditional or narrative review, or simply a literature review.

The following table outlines the different features of a systematic review and a traditional literature review.

Systematic review vs. Literature review

Features	Systematic review	Literature review
Aim	Tightly specified objectives to answer a specific research question	Gain a broad understanding and description of a field
Scope	Narrow focus	Big picture
Planning the review	Transparent process with documented audit trail defined in a protocol	Nothing defined, allows for creativity and exploration
Searches	Rigorous and comprehensive search for ALL studies, explicit search strategy across numerous sources	Searching is probing, moving from study to study, following-up leads
Study selection	Predetermined criteria for including and excluding studies uniformly applied	Selection is variable as determined by the reviewer
Appraisal	Checklists to assess the quality of studies	Based on the reviewer's opinion
Synthesis	Tabular format with short summary answers	Discursive
Methodology	Must be presented for transparency	Not necessarily provided
Inferences	Based on all available evidence	Based on a sample of the evidence
Timeline	Months to years (average 18 months)	Weeks to months
Authors	Three or more	One or more

Features	Systematic review	Literature review
Value	Connects practising clinicians to high-quality evidence; Informs evidence-based practice	Provides a summary of literature on a topic

Watch the following short video to learn about the difference between a systematic review and a meta-analysis.

Systematic review vs Meta-analysis (5 mins)

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://rmit.pressbooks.pub/ researchwritingmodules/?p=1720#oembed-1

Systematic review vs Meta-analysis (5 mins) by Research Masterminds (YouTube)

Some brief information about other types of reviews, such as scoping reviews, rapid reviews, and meta-analyses is available from the library guide: Systematic Reviews.

Benefits of a systematic review

A systematic review has several advantages, including:

- Being considered the highest level in the hierarchy of literature evidence.
- Provides a definitive answer to a question, commonly about therapy, prevention, and causes of disease or harm.
- The methods used to find and select studies reduce bias and are more likely to produce reliable and accurate conclusions.
- Summarises findings from multiple studies, reducing bias when drawing conclusions and making the findings more reliable.
- Findings might be applied to everyday practice or to inform policy.
- Identifies knowledge gaps that call for more research.

Benefits for HDR candidates

Conducting a systematic review provides several benefits:

- it fulfills the request made by your supervisor to conduct the systematic review
- it contributes to your thesis
- the paper can be published
- it contributes to your research knowledge of the topic.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=1720#h5p-14

DEVELOPING THE RESEARCH QUESTION

A systematic review is an in-depth attempt to answer a specific, focused question in a methodical way.

A clearly defined research question should accurately and succinctly sum up the review's line of inquiry.

Photo by Tingey Injury Law Firm on Unsplash

In developing the research question ensure that it is not just a topic, but a properly formulated question that is answerable.

Consider whether your question will focus on diagnosis, intervention, prognosis, or etiology? Is there a study design (e.g. Randomised Controlled Trials) that would provide the best answer?

A good question will combine several concepts. Identifying the relevant concepts is crucial to the successful development and execution of your systematic review. Your research question should provide you with a checklist of the main concepts to be included in your search strategy.

If appropriate, use a framework to help you develop your

research question. A framework will assist in identifying the important concepts in your question.

One technique often used to help formulate a clinical research question is the PICO model.

P = Population / Patient / Problem
I = Intervention / Indicator
C = Comparison / Control
O = Outcome

There are other frameworks such as SPICE, SPIDER, and ECLIPSE. More information on these frameworks is available from the library guide: Systematic Reviews.

Activity

If you were undertaking a systematic review and researching the effectiveness of acupuncture for

treating allergic rhinitis what would your research question be?

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=1733#h5p-17

Think about one of your research questions. How might you adjust the question by applying the use of the PICO framework?

Best Practice Tip

Prior to commencing the systematic review, first, determine if a similar review has been recently done.

You could do this by searching relevant databases or the PROSPERO register of systematic reviews.

WRITING THE PROTOCOL

A protocol should be prepared *before* a review is started and used as a guide to carry out the review.

The aim of the protocol is to minimise bias by having pre-defined eligibility criteria of what *will*, and *will not*, be included in the review.

The research protocol is a planning document that will:

- describe the rationale for the review
- set out the review objectives
- detail the sources and search strategy used to locate studies
- detail how studies will be selected based on the defined eligibility criteria for the

> inclusion/exclusion of studies
> - detail how the studies will be critically analysed
> - provide the basis of how the findings will be reported.

The protocol is developed in conjunction with determining search terms.

A protocol promotes research integrity, accountability, and transparency of the completed review.

Best Practice Tip

It is recommended that you use a standard such as the 27 item PRISMA checklist to develop your protocol. This document will then serve well as a guide to what should

Photo by Han Chenxu on Unsplash

be included when the findings of the systematic review are reported.

What is PRISMA?

PRISMA is the Preferred Reporting Items for Systematic reviews and Meta-Analyses. PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://rmit.pressbooks.pub/researchwritingmodules/?p=1736#h5p-15

PLANNING YOUR SEARCH STRATEGY

Planning your search is critical to the success of the systematic review with the following iterative steps included:

1. Where to search, locating the appropriate sources to search, which will work, which won't.
2. How best to effectively search, to develop the search terms and how they will be combined.
3. Testing that your search strategy will yield the anticipated results to answer the research question.

Sources to search

The search for literature for a systematic review should be rigorous and comprehensive to find ALL information available on a particular topic. It is therefore important to widely and thoroughly search published and unpublished research.

Photo by Jan Antonin Kolar on Unsplash

There are several types of sources that you can search, including; databases, grey literature, trials, and reference lists. You can also try hand-searching.

For HDR Candidates

As an HDR candidate, you will most likely only use databases for your systematic review, although

confirm with your supervisor their expectations on which sources to search.

Databases – It is important to search across a range of databases as no one database covers all the related literature. It is not acceptable to search just one database. The decision regarding which databases to search depends on the topic of the review. The database searches need to be comprehensive and reproducible.

Grey Literature – This is not controlled by commercial publishers but rather is produced by organisations, governments, and industry. Grey literature is less likely to exhibit publication bias and so can provide balance.

Trials – Many clinical trials are unpublished, so when appropriate it is important to include unpublished and ongoing studies to minimise bias.

Hand searching – Not all trial reports are included in bibliographic databases, and trials may not be easily identified in database search results when accessing the titles and abstracts. Hand searching is a manual page-by-page examination of relevant journals and conference proceedings in order to identify published trials.

Reference lists – It can be fruitful to search the reference lists of relevant systematic reviews and meta-analyses, as well as

other key identified studies. Using this search method would be done in the preliminary stages to help determine that search results did contain these papers.

Planning your literature search

The planning phase of developing, testing, and revising your search queries is crucial to the success of the systematic review.

Do you have a set of relevant papers already that you want to include in your systematic review?

It is useful to build a 'sample set' of relevant references before you develop your search strategy. The 'sample set' may include:

Photo by Andrew Neel on Unsplash

- key papers recommended by your supervisor
- references used in similar systematic reviews

The 'sample set' of references will enable you to:

- help identify relevant search terms
- test that your search strategy will retrieve these references

(and subsequently other relevant references on your research topic)

Developing, testing, and revising your search strategy

The search strategy needs to include a detailed list of **search terms** for each concept to ensure all relevant studies are captured for the review. Search terms will be made up of keywords or phrases, as well as database subject headings. Each database uses a different criterion to classify articles, so the subject headings will differ between them.

When using multiple databases, you are likely to encounter a large volume of resources. When planning your searches, you should continually adjust search terms and/or selection criteria in order to make sure you have a comprehensive body of references.

It is recommended that you **test your search terms** to determine if all the subject headings and words/phrases will return useful results. Test your search strategy in a key database. Does it retrieve any papers from your 'sample set' that are contained in that database? Are the results of the search relevant to your topic? What proportion are irrelevant? Identify any terms that are retrieving large numbers of irrelevant papers.

Documenting your search

It is essential that you thoroughly document your search process in enough detail to ensure that it can be reported correctly in the review. An Excel spreadsheet is one tool that you could consider using to document your searching.

For each database search, you should record:

- the date the search was run
- the name of the database
- the name of the database provider (e.g. ProQuest or EBSCO)
- your search strategy – include the keywords you used and how these were combined in the search
- any filters or limitations used, such as years, language, etc.
- the number of studies identified

PLANNING YOUR SEARCH TERMS

Define your research question

If you were researching the effectiveness of acupuncture for treating allergic rhinitis, you might begin with a research question that looks like the following.

Example research question

How effective is acupuncture in treating allergic rhinitis?

This question could be improved by utilising the PICO framework to look like this:

Improved example research question

In patients with allergic rhinitis is acupuncture compared with pharmacological treatment more effective in decreasing pain symptoms?

P (problem) = In patients with allergic rhinitis

I (intervention) = is acupuncture

C (comparator) = compared with pharmacological treatment

O (outcome) = more effective in decreasing pain symptoms?

Compiling a list of search terms

Let's look at two of the concepts from the research question:

1. **allergic rhinitis**
2. **acupuncture**

When you start compiling a list of possible search terms you need to think of your own keywords, as well as the thesaurus (i.e. subject) terms used by *each* of the databases you will be searching.

The following table shows some keywords and thesaurus terms for allergic rhinitis and acupuncture. The thesaurus terms are MeSH (Medical Subject Headings) as used by the PubMed database. Thesaurus terms for other databases would be added to the list.

Database search terms

Concepts	Allergic rhinitis	Acupuncture
Keywords	allergic rhinitis hayfever hay fever pollinosis rose cold rose fever perennial hayfever seasonal hayfever	plum blossom ear acupuncture ear acupressure auricular therapy moxa laser acupuncture seven star needle electro-acupuncture electro acupuncture TENS transcutaneous nerve stimulation transcutaneous electrical nerve stimulation electro-stimulation electro stimulation pharmacopuncture point injection
MeSH (Medical Subject Headings)	rhinitis, allergic rhinitis, allergic, seasonal rhinitis, allergic, perennial respiratory hypersensitivity	acupuncture meridians electroacupuncture moxibustion auriculotherapy acupressure acupuncture, ear acupuncture therapy acupuncture analgesia acupuncture points transcutaneous electric nerve stimulation

COMBINING YOUR SEARCH TERMS

Combine with Boolean operators

To combine the different search terms the boolean operators of OR and AND need to be used.

OR operator broadens your search
Use the boolean operator **OR** to combine keywords related to a single concept. This **broadens your search**, increasing the number of results. This means that each search term listed for allergic rhinitis would be combined with an OR, and similarly for acupuncture.

AND operator narrows your search
Use the boolean operator **AND** to combine keywords related to different concepts. This **narrows your search**, decreasing the number of results. The search results for allergic

rhinitis would be combined with an AND with the search results for acupuncture.

NOT operator narrows your search

Use the boolean operator **NOT** operator to exclude a term. This is useful if you don't want to find any records that contain a particular term. Use it with care to avoid excluding relevant articles that briefly mention the second term. Searching for allergic rhinitis NOT children will exclude all records that mention children as well as allergic rhinitis and children together.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You

can view it online here:
https://rmit.pressbooks.pub/
researchwritingmodules/?p=2195#h5p-19

The search query

The search features of library databases make constructing your search query easier, especially when using advanced search options. For example, the Boolean operators can usually be selected from a drop-down menu. Some databases allow you to enter the search terms on separate lines of an Advanced or Basic search form. Concepts can be entered on separate lines that are then combined using the OR and AND operators.

Best Practice Tip

If there are many synonyms and subject headings for a single concept, you may find it helpful to break this concept into a couple of separate searches that you can then combine using

OR, as in the example below. The first concept is **allergic rhinitis** and the second concept is **acupuncture**.

Search query

Search line	Terms combined	Notes
1	"Allergic rhinitis" OR hayfever OR "hay fever" OR pollinosis OR "rose fever" OR "perennial hayfever" OR "seasonal hayfever"	Concept 1 keyterms
2	"Rhinitis, Alllergic"[Mesh] OR "Rhinitis, Allergic, Seasonal"[Mesh] OR "Rhinitis, Allergic, Perennial"[Mesh] OR "Respiratory Hypersensitivity"[Mesh]	Concept 1 MeSH headings
3	1 OR 2	All Concept 1
4	"plum blossom" OR "ear acupuncture" OR "ear acupressure" OR auricular therapy OR moxa OR "laser acupuncture" OR "seven star needle" OR "electro-acupuncture" OR "electro acupuncture" OR TENS OR "transcutaneous electrical nerve stimulation" OR "transcutaneous nerve stimulation" OR "electrostimulation" OR pharmoacupuncture OR "point injection"	Concept 2 keyterms
5	"Acupuncture"[Mesh] OR "Meridians"[Mesh] OR" Electroacupuncture"[Mesh] OR "Moxibustion"[Mesh] OR "Auriculotherapy"[Mesh] OR "Acupressure"[Mesh] OR "Acupuncture, Ear"[Mesh] OR "Acupuncture Therapy"[Mesh] OR "Acupuncture, Analgesia"[Mesh] OR "Acupuncture Points"[Mesh] OR 'Transcutaneous Electric Nerve Stimulation"[Mesh]	Concept 2 MeSH headings
6	4 OR 5	All Concept 2

Search line	Terms combined	Notes
7	3 AND 6	Combined concepts

Our search query using the PubMed database and the listed keywords and MeSH terms for allergic rhinitis, and similarly for acupuncture, would look like the following.

Example search query

"Allergic rhinitis" OR hayfever OR "hay fever" OR pollinosis OR "rose fever" OR "perennial hayfever" OR "seasonal hayfever" OR "Rhinitis, Alllergic"[Mesh] OR "Rhinitis, Allergic, Seasonal"[Mesh] OR "Rhinitis, Allergic, Perennial"[Mesh] OR "Respiratory Hypersensitivity"[Mesh] **AND** "plum blossom" OR "ear acupuncture" OR "ear acupressure" OR auricular therapy OR moxa OR "laser acupuncture" OR "seven star needle" OR "electro-acupuncture" OR "electro acupuncture" OR TENS OR "transcutaneous

electrical nerve stimulation" OR "transcutaneous nerve stimulation" OR "electrostimulation" OR pharmoacupuncture OR "point injection" OR "Acupuncture"[Mesh] OR "Meridians"[Mesh] OR" Electroacupuncture"[Mesh] OR "Moxibustion"[Mesh] OR "Auriculotherapy"[Mesh] OR "Acupressure"[Mesh] OR "Acupuncture, Ear"[Mesh] OR "Acupuncture Therapy"[Mesh] OR "Acupuncture, Analgesia"[Mesh] OR "Acupuncture Points"[Mesh] OR 'Transcutaneous Electric Nerve Stimulation"[Mesh]

The library guide Starting your literature review has a page that addresses planning your search. It covers identifying the main aspects/concepts of your topic, compiling a list of search terms, utilising different search techniques, and the search query.

ANALYSING SEARCH RESULTS

Once the search results are obtained the analysis phase of the systematic review commences where each paper must be judged on validity and quality. The decisions on which papers to include and exclude are based on the eligibility criteria specified in the protocol.

Best Practice Tip

It is recommended that you use the <u>PRISMA flow diagram</u> to record the number of search results from each database and the changes to those numbers as the screening process is conducted. This diagram should be included in the reported findings of the systematic review.

What is PRISMA?

PRISMA is the Preferred Reporting Items for Systematic reviews and Meta-Analyses. PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.

Screening papers

The screening process of a systematic review will usually involve more than one reviewer, with the reviewers assessing each paper against the eligibility criteria for inclusion or exclusion from the review as defined in the protocol.

Each reviewer will need to provide a rationale for how the papers match the eligibility criteria or have some value to the systematic review. This is done

Photo by Nong V on Unsplash

separately by each reviewer to ensure minimal bias. The results are then compared.

The screening is done incrementally in two phases. An agreement must be reached by all reviewers, at each phase, on which papers are to be included and excluded.

Phase 1 – **Titles and abstracts** of each paper are assessed against the eligibility criteria.

Phase 2 – The process is repeated where the **full text** of each of the remaining papers are assessed against the eligibility criteria.

The remaining papers are those that will contribute to the systematic review.

Critical appraisal

The critical appraisal process examines the validity and applicability of the studies. It is important to critically evaluate the literature to:

- assess the benefits and strengths of the research against flaws and weaknesses
- decide whether studies have been undertaken in a way that makes their findings reliable
- make sense of the results
- know what these results mean in the context of the clinical decision being made
- assess the usefulness of the evidence for clinical decisions.

There are several **checklists** available to assist in the process of determining the quality of the studies. A checklist should be chosen to assess sources of bias that are likely to affect results in relation to the research question.

Take a look at the following sites for examples of critical appraisal tools that can be used to assess the quality, validity, and bias of papers.

- [CASP (Critical Appraisal Skills Programme) Checklists](#)
- [Joanna Briggs Critical Appraisal Tools](#)
- [Risk of bias assessment tools from the University of Bristol](#)

SYNTHESISING THE DATA

Synthesis is a stage in the systematic review process where extracted data, that is the findings of individual studies, are combined and evaluated.

The general purpose of extracting and synthesising data is to show the outcomes and effects of various studies, and to identify issues with methodology and quality. This means that your synthesis might reveal several elements, including:

Photo by Pawel Czerwinski on Unsplash

- overall level of evidence
- the degree of consistency in the findings
- what the positive effects of a drug or treatment are, and what these effects are based on
- how many studies found a relationship or association

between two components, e.g. the impact of disability-assistance animals on the psychological health of workplaces

There are two commonly accepted methods of synthesis in systematic reviews:

1. Qualitative data synthesis
2. Quantitative data synthesis (i.e. meta-analysis)

The way the data is extracted from your studies, then synthesised and presented, depends on the type of data being handled.

Qualitative data synthesis

In a qualitative systematic review, data can be presented in a number of different ways. A typical procedure in the health sciences is **thematic analysis**.

Thematic synthesis has three stages:

1. the coding of text 'line-by-line'
2. the development of 'descriptive themes'
3. and the generation of 'analytical themes'

If you have qualitative information, some of the more common tools used to summarise data include:

- textual descriptions, i.e. written words
- thematic or content analysis

Example qualitative systematic review

A good example of how to conduct a thematic analysis in a systematic review is the following journal article on cancer patients. In it, the authors go through the process of:

1. identifying and coding information about the selected studies' methodologies and findings on patient care
2. organising these codes into subheadings and descriptive categories
3. developing these categories into analytical themes

What Facilitates "Patient Empowerment" in Cancer Patients During Follow-Up: A Qualitative Systematic Review of the Literature

Quantitative data synthesis

In a quantitative systematic review, data is presented statistically. Typically, this is referred to as a **meta-analysis**.

The usual method is to combine and evaluate data from multiple studies. This is normally done in order to draw conclusions about outcomes, effects, shortcomings of studies and/or applicability of findings.

Remember, the data you synthesise should relate to your research question and protocol (plan). In the case of quantitative analysis, the data extracted and synthesised will relate to whatever method was used to generate the research question (e.g. PICO method), and whatever quality appraisals were undertaken in the analysis stage.

If you have quantitative information, some of the more common tools used to summarise data include:

- grouping of similar data, i.e. presenting the results in tables
- charts, e.g. pie-charts
- graphical displays, i.e. forest plots

Example of a quantitative

systematic review

A quantitative systematic review is a combination of qualitative and quantitative, usually referred to as a meta-analysis.

[Effectiveness of Acupuncturing at the Sphenopalatine Ganglion Acupoint Alone for Treatment of Allergic Rhinitis: A Systematic Review and Meta-Analysis](#)

About meta-analyses

A systematic review may sometimes include a meta-analysis**,** although it is not a requirement of a systematic review. Whereas, a meta-analysis also includes a systematic review.

A meta-analysis is a

Photo by [Luca Bravo](#) on [Unsplash](#)

statistical analysis that combines data from previous studies to calculate an overall result.

One way of accurately representing all the data is in the form of a **forest plot**. A forest plot is a way of combining the results of multiple studies in order to show point estimates arising from different studies of the same condition or treatment.

It is comprised of a graphical representation and often also a table. The graphical display shows the mean value for each study and often with a confidence interval (the horizontal bars). Each mean is plotted relative to the vertical line of no difference.

The following is an example of the graphical representation of a forest plot.

Study or Subgroup	Mean Difference IV, Fixed, 95% CI
Petrus 1998	
Prasad 2000	
Prasad 2008	
Total (95% CI)	

Heterogeneity: Chi² = 3.37, df = 2 (P = 0.19); I² = 41%
Test for overall effect: Z = 12.20 (P < 0.00001)

-50   -25   0   25   50
Zinc better   Placebo better

Watch the following short video where a social health example is used to explain how to construct a forest plot graphic.

Forest Plots: Understanding a Meta-Analysis in 5 Minutes or Less *(5:38 mins)*

⊞ *One or more interactive elements has been excluded from this version of the text. You can view them online here:*
https://rmit.pressbooks.pub/ researchwritingmodules/?p=1746#oembed-1

Forest Plots – Understanding a Meta-Analysis in 5 Minutes or Less (5:38 min) by The NCCMT (YouTube)

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=1746#h5p-16

REPORTING THE FINDINGS

While the writing process for a systematic review is generally like writing any other kind of review, there are several aspects to note.

Photo by Jay Castor on Unsplash

In writing the systematic review you should provide an **answer to the research question**.

Careful **documentation of the methodology** is important as it should outline the search process and the selection process. A reader should understand why sources were chosen, how they were assessed, and how conclusions were reached.

The **structure** of the systematic review will differ from the traditional (or narrative) literature review as it should **reflect the stages outlined in the protocol**. Refer to the 27 item PRISMA checklist to see what should be addressed in the protocol.

The value of a systematic review is the **critical reflection and interpretation of the findings**.

Reporting the findings of the systematic review will differ slightly if it is to be presented as part of a thesis, or as a manuscript for publication.

Examples

The following examples are available from the RMIT Research Repository.

Dissertation / Thesis

- Ear-acupressure for allergic rhinitis

Articles

- Ear-acupressure for allergic rhinitis: A systematic review
- Acupressure for respiratory allergic diseases: A systematic review of randomised controlled trials

Activity

To see how a systematic review is written check out examples of published papers and/or completed theses.

1. Find a systematic review by searching a database and examine how the review has been written. For example, search the PubMed database on your topic and filter results by 'article type' selecting 'systematic reviews.'
2. Find a systematic review paper by searching with the words 'systematic review' in the RMIT Research Repository. Consider adding an additional topic word.
3. HDR candidates may like to ask their supervisor if they can recommend a completed thesis that includes a systematic review.

The following image shows how to search the Research

Repository for a thesis with a systematic review if an author's name is unknown. In the search box include a topic along with the words 'systematic review' and select 'Dissertations & Theses' from the drop-down menu.

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EXPLORE FURTHER

Congratulations on completing this module. We have explored the benefits of conducting a systematic review and looked at the differences between a traditional literature review and a systematic review.

Photo by Erwan Hesry on Unsplash

Various aspects of a systematic review were briefly examined, including; the research question and PICO; developing a protocol and PRISMA; resources and strategies for searching the literature; eligibility criteria for screening results; critical appraisal tools to assess the quality of studies; synthesizing data; and writing the review.

Further assistance

Individual assistance – For more assistance in conducting a systematic review contact the library by submitting a Request Research Assistance form.

Library guide – Additional information is available from the online library guide Systematic Reviews.

Cochrane handbook – The [Cochrane Handbook for Systematic Reviews of Interventions](#) details systematic reviews more thoroughly, including meta-analysis. It is the official guide and describes in detail the process of preparing and maintaining Cochrane systematic reviews on the effects of healthcare interventions. The *Handbook* includes guidance on the standard methods applicable to every review (planning a review, searching and selecting studies, data collection, risk of bias assessment, statistical analysis, GRADE and interpreting results), as well as more specialised topics (non-randomized studies, adverse effects, complex interventions, equity, economics, patient-reported outcomes, individual patient data, prospective meta-analysis, and qualitative research).

Learn more

A short video [Introducing systematic reviews](#) (14 mins) is available (Microsoft Stream, login required).

You may also be interested in viewing the following webinar [Systematic Reviews](#) (60 mins) recorded from the Library's PhD Up! program (now called Research Plus). The webinar content complements this online module.

Feedback

Your comments and suggestions on how we can improve this

module will be appreciated. Please complete our [feedback form](#).

What's next?

You have completed this module on Conducting a Systematic Review. You can [return to the Research and Writing Hub](#) to choose another module to complete.

CHOOSING A REFERENCE MANAGER

Welcome to this online module choosing a reference manager. As a researcher, you will need to use a reference manager to organise your references in your work. The module will explore the features of three popular reference managers

Photo by Thought Catalog on Unsplash

– Endnote, Zotero and Mendeley – and help you decide which one is best for your research practices.

Learning Objectives

- Understand why you might want to use a reference manager during the course of your research.
- Learn some of the common features of all reference managers.
- Understand the features that differentiate three common reference managers: EndNote, Zotero, and Mendeley.
- Gain insight into how other researchers at RMIT have used these tools.

This module should take you about 30 minutes to complete.

Work through each section using the navigation footer (i.e. previous/next), or use the contents menu to select a particular section. There are learning activities throughout.

Upon completion, please help us improve this module by taking a moment to complete the feedback form provided at the end.

You may also be interested in viewing the additional resources about reference managers at the end of this module.

WHAT TO CONSIDER

Endnote, Zotero and Mendeley have common features as well as differences. Before you decide what reference manager to use, think about what features will be important to you.

Photo by Max van den Oetelaar on Unsplash

If you try one and decide you do not like it, it is good to know that you can transfer your references to another reference manager – you might want to try more than one before you decide.

Questions to ask

Use these questions to decide what is most important for you and your research. The **Overview of Features,** further down, provides more detail.

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=3593#h5p-47

Overview of features

Features	Endnote	Zotero	Mendeley
Cost	Desktop free for RMIT staff and students. Endnote Online free.	Free	Free Mendeley Institutional Edition for RMIT staff and students. Free limited version.
Storage	Unlimited for RMIT users. 2GB for EndNote Online (free version).	300MB free. Additional storage can be purchased.	100GB personal / 100GB shared as an RMIT user. 2GB personal / 100MB shared for free version.
Available on Windows and Mac OS	Yes	Yes	Yes
Web based	Limited	Yes	Yes
Sync library across multiple devices	Yes, via Endnote Online account.	Yes	Yes
Import references from databases	Yes	Yes	Yes
Extract citations from PDFs	Yes	Yes	Yes

Features	Endnote	Zotero	Mendeley
Import citations from web pages	Endnote Online only.	Yes, and can save a webpage snapshot as an HTML file.	Yes
Add tags to references	Yes	Yes	Yes
Create private groups	Yes	Yes	Yes
Create public groups	No	Yes	No
Sync file attachments across devices	Yes, via Endnote Online.	Yes, enable in settings.	Yes, enable in settings. Optional to sync selected folders only.
Annotate and highlight PDFs	Yes. Annotations not synced.	Yes. Annotations synced across devices.	Yes. Annotations synced across devices.
Full text searching across PDFs	Yes	Yes, not enabled by default.	Yes
Transfer library between applications	Yes	Yes	Yes

Features	Endnote	Zotero	Mendeley
RMIT Harvard style available	Yes	Yes	Yes
Library support	Yes	Limited	Limited
Community support network	Yes, Endnote Community Forums.	Yes, Zotero Forums.	No
Mobile apps for iOS and Android	iPad only	Yes	Yes
Word processor compatibility	MS Word, OpenOffice, LibreOffice, Google Docs, Apple Pages	MS Word, OpenOffice, LibreOffice, Google Docs	MS Word, LibreOffice, LaTeX
Working with figures and charts	Attach figures or charts to references and insert using word processor integration.	Cannot attach figures or charts.	Cannot attach figures or charts.

ENDNOTE

EndNote is the most commonly used reference manager at RMIT University. RMIT University pays for an institutional licence for all staff and students, and one of the main benefits of using EndNote is the support available from the Library.

Features of EndNote

In addition to the main features common to all reference managers, EndNote:

- provides unlimited storage for full-text documents and associated files
- works with a wide range of word processing applications including MS Word (Windows and Mac), OpenOffice and Apple Pages. EndNote also works reasonably well with Google Docs
- has a 'Find full text' function as well as the ability to attach full-text documents
- has good tools for editing existing referencing styles or creating new ones
- allows for the transfer of a Mendeley or Zotero library via a RIS, XML or BibTeX file using the import

functionality.

EndNote also provides an online version called [EndNote Online](). EndNote Online has limited functionality, for example, you can't edit styles or use term lists for journal abbreviations. However, you can use EndNote Online to sync between devices and share groups, or your Library with others. Storage capacity for EndNote Online is dependent on your account type.

Pros and cons of EndNote

Positives	Negatives
Library supported	Poor online option
Many referencing styles	Lose access when leaving RMIT

How to use EndNote 21 in seven minutes: Windows (7:52 mins)

One or more interactive elements has been excluded from this version of the text. You can view them online here:

https://rmit.pressbooks.pub/
researchwritingmodules/?p=3498#oembed-1

How to use EndNote 21 in seven minutes: Windows (7:52 mins) by
EndNote (YouTube)

How to use EndNote 21 in seven minutes: macOS
(7:52 mins)

One or more interactive elements has been
excluded from this version of the text. You
can view them online here:
https://rmit.pressbooks.pub/
researchwritingmodules/?p=3498#oembed-2

How to use EndNote 21 in seven minutes: macOS (7:52 mins) by EndNote
(YouTube)

Resources

There are a number of resources for EndNote available. These
include:

RMIT University Library guide – [EndNote: a beginner's guide](#)

RMIT University Library website – [EndNote reference manager](#)

Instructional guides from Research Plus webinars – [EndNote for your thesis](#)

ZOTERO

As an open source software, [Zotero](#) is widely used and has extensive support and documentation available online.

Features of Zotero

Zotero has:

- 300mb of free storage (additional storage can be purchased)
- full integration of web and desktop versions
- excellent citation capture from webpages, including a preserved snapshot of the webpage as an HTML file
- many library sharing and collaboration options with various permissions levels, from fully public libraries (anyone with the link can edit your shared library) to closed groups (invited people only can view the shared library).

Pros and cons of Zotero

Positives	Negatives
Fully integrated web version	Limited free cloud storage
Excellent citation capture and collaboration options	Dependent on third party servers

Zotero is used by many researchers at RMIT University. Here's a short video of Dr Stephen Rowley speaking about aspects of Zotero that he finds useful.

Dr Stephen Rowley talks about Zotero *(6:11 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=3500#oembed-1

Dr Stephen Rowley talks about Zotero (6:11 mins) by RMIT University Library is licensed under CC BY-NC 4.0

MENDELEY REFERENCE MANAGER

"Mendeley Logo Vertical" by Team Mendeley is licensed under CC BY 2.0, via Wikimedia Commons

Mendeley Reference Manager, often called Mendeley for short, is a freely available reference manager.[1]

Mendeley Reference Manager includes a desktop version which can be installed on Windows, iOS and Linux. For each version there are online guides and a support hub available. It is also available as a web-based application, with synchronization done automatically when online, so your library is accessible even when away from your own devices.

---

1. In 2022, Mendeley Reference Manager for Desktop replaced a prior version known as Mendeley Desktop. In this module, the current Mendeley Reference Manager is the focus. More information can be found in our Reference Manager Library Guide.

A citation application for Microsoft Word, called [Mendeley Cite](#), can be used in tandem with Mendeley. It allows you to add references from your Mendeley library without leaving the document.[2]

The new Mendeley Reference Manager (2:24 mins)

> One or more interactive elements has been excluded from this version of the text. You can view them online here:
> https://rmit.pressbooks.pub/researchwritingmodules/?p=3584#oembed-1

[The New Mendeley Reference Manager](#) (2:24 mins) by Mendeley ([YouTube](#))

Features of Mendeley Reference Manager

- Easily search your library and organise references into collections.

---

2. Mendeley Cite replaces the prior application known as Mendeley Desktop Citation Plugin. More information on Citation Plugin can be found on the [Mendeley support site](#).

- Use Mendeley Cite with Microsoft Word for seamless integration of your library with your written work.
- Import references directly from the web using the Mendeley Web Importer plugin for Chrome and Firefox.
- Add, read, organise and annotate PDFs on both the web and desktop applications.
- Access 2GB of free storage (upgrades are available for a fee).
- On a free account, create up to five private groups with 25 members each for collaboration, PDF sharing, and shared annotations.
- Transfer your library to another reference manager via an RIS, XML or BibTeX file, using the desktop version.
- Install the software on Windows, iOS and Linux platforms.
- Use the web version available on Chrome, Firefox, Microsoft Edge, and Safari.
- RMIT staff and students can access the Mendeley Institutional Edition (MIE) which has increased storage and collaboration capacity. More information is available in our Reference Manager Library guide and on the Library Reference management tools website.

However, Mendeley Reference Manager has limited functionality with some word processing applications such as Google Docs and Apple Pages. You cannot search for new resources from within the application. And while its group

functionality allows for sharing of PDF documents, you cannot create open groups or libraries accessible to anyone.

Pros and cons of Mendeley Reference Manager

Positives	Negatives
Free for all, with extra storage for RMIT staff and students	Lose extra storage when you leave RMIT
Citation integration with MS Word with Mendeley Cite	Poor integration with Google Docs and Apple Pages
Annotate and share PDFs within private groups	No public groups

Mendeley is used by many researchers at RMIT University. Here's a short video of Professor James Harland speaking about aspects of Mendeley that he finds useful.

James Harland on Mendeley *(2:16 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=3584#oembed-2

[Dr James Harland Mendeley](#) (2:16 mins) by [RMIT University Library](#) is licensed under [CC BY-NC 4.0](#)

SUMMING IT ALL UP

You have seen the differences between three major reference managers. No particular reference manager is ideal for everyone, so making a right choice depends on what you need.

Here is a quick quiz to help you decide which is best for you. There are nine multiple choice questions, based on the content you have read so far. The quiz will give you immediate results, and will continue automatically as you answer.

Activity

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=5128#h5p-65

EXPLORE FURTHER

Congratulations on completing this module!

We have explored three different reference managers and identified the similarities and differences between them. We've also heard how academics use these tools.

Photo by Austin Park on Unsplash

We hope the information has helped you decide which reference manager you'd like to use.

Further assistance

See our Reference Managers Library guide and Reference management tools website for more information.

For individual assistance, contact the Library by submitting a Request Research Assistance form.

Learn more

This video will give you a brief overview of the features of Endnote, Zotero, and Mendeley. [Choosing a Reference Manager – EndNote, Zotero, Mendeley](#) (17 mins). Please note: you will need to log into your RMIT account to view this video.

Feedback

Your comments and suggestions on how we can improve this module will be appreciated. Please complete our [feedback form](#).

What's next?

You have completed this module on Choosing a Reference Manager. You can [return to the Research and Writing Hub](#) to choose another module.

DEVELOPING AN EFFECTIVE RESEARCH PROPOSAL

Welcome to this RMIT University Library online module which provides you with key information, strategies and resources for developing an effective research proposal.

The module is aimed at graduate researchers (PhD or Masters by Research) who are seeking to

Photo by Joshua J. Cotten on Unsplash

understand why and how to write their research proposal.

The course materials include information, videos and learning activities which explore key features of developing effective research proposals.

We hope you find this module useful and stimulating.

Learning objectives

On successful completion of the module, you will be able to:

1. determine the purpose and importance of the research proposal
2. create effective research questions
3. identify they key components which structure a research proposal, and
4. familiarise yourself with writing the "what", "why" and "how" sections of your proposal.

This module should take you about 30 minutes to complete.

Work through each chapter using the navigation footer (i.e. previous/next) or use the contents page to select a particular section.

Please help us improve this module by taking a moment to complete the feedback form provided at the end.

WHAT IS A RESEARCH PROPOSAL?

Overview

A research proposal is a type of text which maps out a proposed central research problem or question and a suggested approach to its investigation.

In many universities, including RMIT, the research proposal is a formal requirement. It is central to achieving your first milestone: your Confirmation of Candidature. The research proposal is useful for both you and the University: it gives you the opportunity to get valuable feedback about your intended research aims, objectives and design. It also confirms that your proposed research is worth doing, which puts you on track for a successful candidature supported by your School and the University.

Although there may be specific School or disciplinary requirements that you need to be aware of, all research proposals address the following central themes:

- **what** you propose to research
- **why** the topic needs to be researched
- **how** you plan to research it.

Purpose and audience

Before venturing into writing a research purposal, it is important to think about the **purpose** and **audience** of this type of text. Spend a moment or two to reflect on what these might be.

Reflection

What do you think is the purpose of your research proposal and who is your audience?

Purpose

The purpose of your research proposal is:

1. To allow experienced researchers (your supervisors and their peers) to assess whether

- the research question or problem is viable (that is, answers or solutions are possible)
- the research is worth doing in terms of its contribution to the field of study and benefits to stakeholders
- the scope is appropriate to the degree (Masters or PhD)
- you've understood the relevant key literature and identified the gap for your research
- you've chosen an appropriate methodological approach.

2. To help you clarify and focus on what you want to do, why you want to do it, and how you'll do it. The research proposal helps you position yourself as a researcher in your field. It will also allow you to:

- systematically think through your proposed research, argue for its significance and identify the scope
- show a critical understanding of the scholarly field

around your proposed research

- show the gap in the literature that your research will address

- justify your proposed research design

- identify all tasks that need to be done through a realistic timetable

- anticipate potential problems

- hone organisational skills that you will need for your research

- become familiar with relevant search engines and databases

- develop skills in research writing.

Audience

The main audience for your research proposal is your reviewers. Universities usually assign a panel of reviewers to which you need to submit your research proposal. Often this is within the first year of study for PhD candidates, and within the first six months for Masters by Research candidates.

Photo by Ahmed Galal on Unsplash

Your reviewers may have a strong disciplinary understanding of the area of your proposed research, but depending on your specialisation, they may not. It is therefore important to create a clear context, rationale and framework for your proposed research. Limit jargon and specialist terminology so that non-specialists can comprehend it. You need to convince the reviewers that your proposed research is worth doing and that you will be able to effectively 'interrogate' your research questions or address the research problems through your chosen research design.

Your review panel will expect you to demonstrate:

- a clearly defined and feasible research project
- a clearly explained rationale for your research
- evidence that your research will make an original contribution through a critical review of the literature
- written skills appropriate to graduate research study.

DEVELOPING A RESEARCH QUESTION

Your research questions are perhaps the most important part of your study. They guide your choice of methodology and underpin each chapter in your thesis or dissertation. It's worth investing time to develop robust questions that will guide your research.

Identifying an effective research question

While the criteria for an effective research question vary considerably, generally, a research question should be:

- **focused –** its scope should be adequately narrow to allow you to carry out your research within the available timeframe and using available resources.

- **analytical (as opposed to descriptive)
  –** your research question needs to display
  enough complexity so that the answers to
  it cannot be easily obtained. For example,
  it cannot be answered through a simple
  internet search or fact check. An effective
  research question would require answers
  which are subject to interpretation,
  analysis and synthesis.
- **effectively expressed –** the research
  question needs to use clear, specific and
  concise language so that it is accessbile to
  the reader.

Activity

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https://rmit.pressbooks.pub/researchwritingmodules/?p=233#h5p-3

Strategies for developing effective research questions

To develop effective research questions, you may like to try one of the following two key strategies:

I) Convert your topic into one or more research questions by:

1. breaking down your topic into its different features
2. choosing a feature that interests you to narrow down your topic scope
3. brainstorming and reading literature around this feature to focus it further
4. convert this focused feature into question form.

Photo by Tingey Injury Law Firm on Unsplash

II) Formulate a problem statement and then convert it into question form. Use the following template as a guide to writing your problem statement:

1. I am examining ...
2. Because ...
3. It matters because...

The following presentation shows how to use the above discussed strategies for developing robust research questions.

Work through each section of the webinar. Feel free to pause the video at suitable points and complete the included activities.

Presentation on developing research questions *(12:54 min)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/researchwritingmodules/?p=233#oembed-1

[Developing your research questions](#) (12:54 min) by RMIT University ([YouTube](#))

Further resources

For more information on research questions, consult the following resources:

- [How Research Questions Can Make or Break Your Project (8:36 min)](#) by Professor James Arvanitakis ([YouTube](#))
- [Research Questions Hypothesis and Variables: Connecting the Dots (7:55 min)](#) by Associate Professor

Ron Wallace (YouTube)

STRUCTURING KEY SECTIONS

All research proposals need to cover the following three main areas:

- **what** you propose to research
- **why** the topic needs to be researched
- **how** you plan to research it.

How these three areas translate into a structure or into sections in a research proposal varies significantly.

There isn't usually a single set structure for all research proposals, so you'll need to check your School guidelines. There is also substantial disparity in the length required, with some Schools asking for 2 – 5 pages, some 8 – 10 pages, and others considerably longer.

The specific sections required in research proposals can also vary between Schools.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=880#h5p-1

To help you work out how you went with the above activity, the table below lists sections that are **always included** and those that are **often included** in a research proposal.

Always included

- Title
- Background to the study
- Literature review
- Research questions, problems and/or hypotheses
- Rationale for the research
- Scope of the research
- Research methodology
- Milestones or timeline
- Research significance/contributions
- Reference list

Often included

- Abstract
- Table of Contents
- Introduction
- Definitions
- Statement of the problem
- Research aims and/or objectives
- Epistemological stance and/or theoretical framework
- Particular needs (e.g. resources)
- Expected preliminary outcomes
- Ethics approval/evidence of application

For some general RMIT discipline-based guidelines, consult [RMIT's discipline based guidelines to writing research proposals](#) (DOCX, 1 page).

WRITING YOUR RESEARCH PROPOSAL

Writing the 'what' of your proposed research

The purpose of this part of your research proposal is to generally describe what your research is about.

The 'what' part establishes how your research is situated

Photo by Kaitlyn Baker on Unsplash

within your discipline or field. It provides fundamental information, such as:

- the context for the research, which can be:
  - the key ideas, theories and concepts
  - the major issues and debates
  - the key players and seminal texts or key artists, and
  - the questions that have been asked around this topic.

- your research questions, problems or hypotheses
- the scope of the proposed research (i.e. what you will and what you won't do).

The 'what' part of your research proposal may also include:

- the aims and/or objectives of your research
- an introduction to the theoretical framework within which your research sits
- a statement of the problem grounded in the context or theoretical framework and a resulting argument for your research to be conducted
- the timeliness of your proposed research (i.e. why should it be done right now?)
- definitions if needed.

Writing the 'why' of your proposed research

A key requirement of your research proposal is to justify that your research is worth doing. Your review panel will be looking for a succinct and convincing argument about what sets your proposed research apart from others, and why *not* doing this research leaves an important problem unaddressed.

Ways of justifying your research include showing that your

project will make a significant and substantial contribution in terms of:

1. how it fits within an existing body of scholarship/ literature/practice
2. how it builds on and adds to this body of knowledge
3. what the value of your research is and for whom (e.g. a particular community, industry, etc.).

Reflection

Think about how you might go about justifying your research.

- What key literature is your proposed research situated within?
- How will your research build on this?
- Who will benefit from your research and how?

Critical engagement with the literature is crucial in order to

justify your research. You must demonstrate that you understand:

- the main concepts and themes, underlying principles, and established theories related to your research
- areas of controversy and contention
- the key scholars and seminal research related to your topic.

In some disciplines, discussion of the above points is located in the 'what' rather than the 'why' section of your research proposal. In fact, you will almost certainly cover some of these points when you're describing and contextualising your research. Often this is done in a general way in the 'what' section and in a more critical, in-depth way in the 'why' section. A rule of thumb is to ask yourself whether this information is **contextualising** or **justifying** your research.

Writing the 'how' of your proposed research

This part of your research proposal involves describing how you plan to find answers to your research questions or resolve the research problems. In other words, it entails describing the design of your research.

A difficulty you may have in this section is in providing the

right amount of information – not too little nor too much. You need to give as much information as is needed to argue to the review panel that the research is do-able and to justify the components of your research design.

Reflection

Which of these questions will you need to answer in your research design (i.e. the 'how' section of your research proposal)?

- What is your chosen research design and rationale?
- What theories, concepts or models inform your research design?
- What are the step-by-step methods or process used?
- What constitutes your creative practice?
- How will you engage with your creative practice (e.g. reflection, testing, theorising)?

- What type of data will be collected?
- What are your sources of data?
- Where and how will the data be collected?
- How will the data be analysed?
- What are the strengths and limitations of your methodology?
- What resources are required (equipment, other)?
- How reliable and valid are your methods?
- What ethical issues relate to your research methods, and how will you address these?
- Can you complete your research within the official timeframe (demonstrated on a Gantt chart)?

Learn More

To learn more about writing a research proposal, watch this webinar from the Library.

RMIT webinar on writing a research proposal *(23:59)*

One or more interactive elements has been

excluded from this version of the text. You can view them online here: https://rmit.pressbooks.pub/researchwritingmodules/?p=239#oembed-1

[Writing a research proposal](#) (23:59 min) by RMIT University LIbrary ([YouTube](#)).

Further resources

The [Manchester Academic Phrase Bank](#) provides a list of 'starter phrases' which can be very helpful for writing different sections of your research proposal. The Bank's [Introducing Work](#) and [Referring to Sources](#) sections may be particularly useful for the 'what' and 'why' parts of the proposal while [Describing Sources](#) would be useful for the 'how' part.

For some RMIT discipline-based guidelines for research proposals illustrating the 'what', 'why', and 'how sections, consult: [Discipline- based guidelines (DOCX, 1 page)](#).

EXPLORE FURTHER

Congratulations on completing this module. We have explored the nature, purpose, and key component structures of research proposals. We have also discussed some strategies for writing

Photo by Jason Leung on Unsplash

effective research questions as well as the 'what', 'why' and 'how' sections of a proposal.

Further assistance

For more assistance in planning or writing your research proposal, consult the following resources:

- How Research Questions Can Make or Break Your Project (8:36 min) by Professor James Arvanitakis (YouTube)
- Research Questions Hypothesis and Variables: Connecting the Dots (7:55 min) by Associate Professor Ron Wallace (YouTube)

- The Manchester Academic Phrase Bank

You can also contact the Library by submitting a research request form.

Feedback

Your comments and suggestions on how we can improve this module will be appreciated. Please complete our feedback form.

What's next?

You have completed this module on the Research Proposal. To choose another module to complete, you can return to the Research and Writing Hub.

WRITING YOUR LITERATURE REVIEW

Welcome to this RMIT University Library online module which provides you with key information, strategies and resources for writing a literature review.

Photo by Susan Q. Yin on Unsplash

The module is aimed at graduate researchers (PhD or Masters by Research) who are seeking to understand the purpose of a literature review and how to write one.

The course materials include information, videos and learning activities which explore key features of writing a literature review.

We hope you find this module useful and stimulating.

Learning objectives

On successful completion of the module, you will be able to:

1. Understand the purpose of a literature review.
2. Understand how to organise your ideas as you review literature.
3. Understand how to write your literature review, including how to structure and style your literature review.

This module should take you about 30 minutes to complete.

Work through each chapter using the navigation footer (i.e. previous/next) or use the contents page to select a particular section.

Please help us improve this module by taking a moment to complete the feedback form provided at the end.

WHAT IS A LITERATURE REVIEW?

A literature review is a critical analysis of the literature related to your research topic. It evaluates and critiques the literature to establish a theoretical framework for your research topic and/or identify a gap in the existing research that your research will address.

A literature review is **not** a summary of the literature. You need to engage deeply and critically with the literature. Your literature review should show your understanding of the literature related to your research topic and lead to presenting a rationale for your research.

Photo by Clay Banks on Unsplash

A literature review focuses on:

- the context of the topic
- key concepts, ideas, theories and methodologies
- key researchers, texts and seminal works
- major issues and debates
- identifying conflicting evidence
- the main questions that have been asked around the topic
- the organisation of knowledge on the topic
- definitions, particularly those that are contested
- showing how your research will advance scholarly knowledge (generally referred to as identifying the 'gap').

This module will guide you through the functions of a literature review; the typical process of conducting a literature review (including searching for literature and taking notes); structuring your literature review within your thesis and organising its internal ideas; and styling the language of your literature review.

The purposes of a literature review

A literature review serves two main purposes:

1) To show awareness of the present state of knowledge in a particular field, including:

- seminal authors
- the main empirical research
- theoretical positions
- controversies
- breakthroughs as well as links to other related areas of knowledge.

2) To provide a foundation for the author's research. To do that, the literature review needs to:

- help the researcher define a hypothesis or a research question, and how answering the question will contribute to the body of knowledge;
- provide a rationale for investigating the problem and the selected methodology;

- provide a particular theoretical lens, support the argument, or identify gaps.

Activity

Before you engage further with this module, try the quiz below to see how much you already know about literature reviews.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://rmit.pressbooks.pub/ researchwritingmodules/?p=2237#h5p-21

THE PROCESS OF WRITING A LITERATURE REVIEW

Writing a literature review is a complex and non-linear process. It usually involves reiterations of all or any of the following steps:

Photo by Darwin Vegher on Unsplash

1. Conducting a Library search for sources
2. Taking notes while critically reading and analysing the literature
3. Structuring the literature review
4. Styling the language of the literature review.

Conducting a Library search for sources

One of the first and important steps in carrying out a literature

review is to conduct an effective Library search which will help you identify the most relevant sources for your research topic.

If you need some assistance with searching the literature strategically, you might want to work through the [Strategies and Resources for Searching the Literature module](#) in this collection. Amongst other things, this module will help you to effectively:

- form key words or descriptors for your topic
- create a search query
- find different and relevant types of resources
- use more advanced searching techniques.

Taking notes

Taking effective notes is another key part of the process of writing up your literature review.

There is a variety of ways that one can use to take notes. These include:

- highlighting and writing notes in margins
- drawing a diagram or a mind map
- using the [Cornell note-taking system](#).

In this module, we will focus on using an annotated bibliography as a note-taking technique.

Using an annotated bibliography to take notes

An annotated bibliography can be a useful way of taking notes as you read the literature and think about what you are reading. It allows you to collect both a summary of the key points from different readings as well as a critical assessment of the literature. It also allows you to provide comments about how a text relates both to your own research and to other literature.

An annotated bibliography has two main sections:

1. A reference (bibliographic information or citation) in your chosen citation style.
2. An annotation (description and comments on the source). The annotation usually provides:

    ◦ a summary of the key points or arguments the source makes
    ◦ a reflection on how the source contributes to your field of

knowledge and how it might be useful in your own research
- ◦ a critical analysis or evaluation of the ideas presented.

What to include in a summary?

When writing an annotated bibliography, start with a summary or description for each source. As you read, take notes in your own words of the aim of the research, the methodologies that have been used, the main arguments and overall findings, and the scope and limitations of the study. This will form the basis of your summary which will be in the form of a coherent 50–100-word paragraph or just two or three sentences.

How to reflect on the relevance of a source to your own research?

Writing a reflection for your annotated bibliography includes writing a few sentences explaining in what ways the source is

useful for, or relates to, the overall theme of your research. This section of the annotation will be particularly helpful when you come to building an argument for your research in your literature review.

Ask yourself:

- What does this source contribute to the ideas I am developing in my research or to the argument/s I am making?

It is worth mentioning that while your reflection states your personal ideas and evaluations, it should still be objective and unemotional.

What to include in a critical analysis?

In providing a critical analysis, you need to focus on the value of the material and sources you have read.

Ask yourself:

- What are the strengths and limitations of the source in terms of aim, methodology, and findings?
- Are the findings sound, logical and well researched?
- Is the source original, important and of a high standard?
- How does this source add to the research in the field?
- Where is its place — and relationship — in the wider field of research and scholarly discussions?

Activity

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https://rmit.pressbooks.pub/researchwritingmodules/?p=4830#h5p-58

STRUCTURING YOUR LITERATURE REVIEW

In this section, you will learn about structuring your literature review. You will find information on where to include the literature review in the overall structure of your thesis as well as how to structure your ideas and arguments within the literature review itself.

Photo by Fausto García-Menéndez on Unsplash

Where to place your literature review in your thesis?

While you are likely to refer to the literature throughout the thesis (e.g. when providing a rationale for the study, justifying your methodology, or linking your discussion back to the

literature), remember that the literature review performs a specific function, which we saw in the section on the purposes of the literature review, and therefore usually appears as a unified and substantial section or chapter.

Accordingly, where you locate your literature review within your thesis depends on the structure of your thesis. Your thesis might follow one of the following three typical structures:

- Traditional
- Traditional complex
- Thematic based

Traditional thesis structure

A traditional thesis reports on a single study.

Usually, in a traditional thesis, the literature review is a standalone chapter:

- Introduction
- **Literature review**
- Methods
- Results and analysis
- Discussion and conclusions

Traditional complex thesis structure

A traditional complex thesis reports on more than one study. Within this structure, there is usually an overall literature review, and then a smaller literature review associated with each study.

- Introduction
- **Main literature review**
- General methods
- Study one introduction
  - **Study one literature review**
  - Methods
  - Results and analysis
  - Discussion and conclusions
- Study two introduction
  - **Study two literature review**

General Introduction

Lit Review

General materials and methods

Study 1

Lit Review

Methods, Results

Study 1 conclusion

Study 2

Lit Review

Methods, Results

Study 2 conclusion

General Discussion (Conclusion)

- ◦ Methods
- ◦ Results and analysis
- ◦ Discussion and conclusions
- General discussion and conclusion

Thematic based thesis structure

A thematic based thesis has its content organised according to themes. Within this structure, there is usually a literature review for each themed chapter.

- Introduction
- Theme 1 – includes a **literature review related to the theme**
- Theme 2 – includes a **literature review related to the theme**
- Theme 3 – includes a **literature review related to the theme**
- Discussion and conclusion

To summarise, depending on the overall structure you choose for your thesis, the section you call your literature review may form:

- a discrete chapter (e.g. traditional thesis)
- different sections distributed among other thematically-based chapters (e.g. topic-based thesis)
- a combination of the above (e.g. traditional complex thesis)

Reflection

What overall structure do you think your thesis will take?

Where will your literature review appear as a result of this overall structure?

The internal structure of the literature review

An effective literature review usually observes the following structure:

- Introduction

- Introduce the problem and the context
- Summarise key trends, themes, areas of controversy and the gap(s) in the literature
- Outline the organisation of the body and indicate the scope of the literature review.

- Body
    - Highlight the development of major concepts/ themese and influential studies.
    - Focus on areas of agreement, modification of design, tensions and inadequacies as you gradually narrow the focus to studies closest to your own
    - Identify the GAP where your research fits. (Note that identifying a gap is critical in a literature review as it justifies or provides an argument for the need for your research).
    - Sum up the major themes that you have reviewed and link to your research

- Conclusion
    - Summarise major contributions
    - Point out gaps or issues to be investigated
    - Relate the literature review to your research question or problem

ORGANISING IDEAS IN THE BODY OF YOUR LITERATURE REVIEW

As discussed in the previous section, the body of your literature review needs to provide an account of the major themes, arguments and debates found in the literature and to articulate how these relate to each other and to your own research.

Since this usually involves reading through and taking notes on a large amount of sources, you will need a strategy that can help you

Photo by Hannah Olinger on Unsplash

organise the different ideas you have drawn from the literature.

One such important organisational strategy is the use of matrices.

Using matrices to organise the literature

Matrices are particularly useful for capturing key information from the texts that you have read and thefore providing an overview of this information.

They can help with identifying patterns such as:

- which texts deal with which key identified themes
- a text's main points and how these fit under key identified themes
- a text's main points and how they can be used / incorporated in your writing
- a text's main points and whether they support or refute a particular argument.

Below are examples of matrices which capture information in the literature according to each of the above four organisational patterns.

Identifying texts dealing with key identified themes

Topic: Prenatal influences on the child				
Concepts > Texts	Harmful substances and diseases	Maternal age and physical characteristics	Domestic violence	Prenatal healthcare
McDonald (2011)	Yes	Yes		
Smith (2009)	Yes		Yes	
Langley (2011)				Yes
Seddon (2012)			Yes	
Anderson (2010)	Yes			Yes
Etc.				

Identifying a text's main points in relation to key identified themes

Topic: Prenatal influences on the child				
Concepts > Texts	Harmful substances and diseases	Environmental dangers	Prenatal health care	Etc.
McDonald (2011)	Tobacco = retarded foetal growth & increased infant mortality			
Smith (2009)		Impact involves interaction of many factors		
Langley (2011)	Tobacco: Generally agrees with Jones but disputes causal influence – too many variables	Challenges in identifying exposure to toxins		
Seddon (2012)	Alcohol: Effects of foetal alcohol syndrome			

Topic: Prenatal influences on the child				
Concepts > Texts	Harmful substances and diseases	Environmental dangers	Prenatal health care	Etc.
Anderson (2010)		Useful table of toxicants and associated foetal impact	Frequency of prenatal examinations – benefits and problems	
Etc.				

Identifying a text's main points in relation to their incorporation in your writing

Topic: Issues in measurement of teaching quality		
Texts	Main points	Comments / use in my writing
Keogh (2011)	Learning performance = index measuring result of learning and quality of teaching	But what does 'quality' of teaching mean?
Brown (2009)	Identifies several criteria of quality of teaching	Contrast 2nd criterion with Keogh's ideas; differences are contentious
Morgan (2011)	Etc.	Etc.

Identifying a text's main points in relation to supporting or refuting an argument

Topic: Does meditation improve the immune system?		
Texts	Support	Refute
O'Dwyer & Jones (2010)	Single case report Healing was more rapid when subjects meditated	
McKenzie (2011)		Two-group design No difference observed
Peters et al. (2009)	Two-group design Meditation group significantly reduced infection rates	
Etc.		

Reflection

Consider the different matricies presented above. Which of these ways of organising your ideas might be useful for you at the moment? (Keep in mind that different approaches might be more useful for you at different stages of reviewing the literature.)

If you would like to further explore the use of matrices as an organisational tool, take a few minutes to choose one of the above matrix types and begin organising the themes, ideas or arguments from the literature you are reading according to it.

STYLING YOUR WRITING IN A LITERATURE REVIEW

In this section, you will learn about styling the language of your literature review in order to develop a researcher voice which expresses authority and a critical stance.

Photo by Aaron Burden on Unsplash

Developing a researcher voice

When you write your literature review, you are synthesising and expressing your understanding of existing research, including how much you accept, question or reject the claims your sources make. The writing therefore needs to show the position you are taking towards the sources you are citing in your literature review.

Writing with authority

Writing with authority is important in all academic writing because you are trying to persuade your reader to accept your argument/s. In a literature review, you are wanting to show confidence in your stance on the existing research as well as in the argument you are developing regarding the gap you have identified in the literature and the need for your research to fill this gap.

In short, your writing needs to:

- Be very clear about the message you want to convey
- Convince others that you are 'right' or that your reasoning is sound and that your ideas 'make sense'
- Predict how your audience will receive your message or which parts of your claims may be contested.

Activity

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=4834#h5p-59

To convey authority, your writing will need to make claims about the literature you are reviewing and the key arguments and ideas related to your area of your research. A claim is different to a regular sentence. A claim in academic writing will provoke, analyse or interpret rather than merely describe or present facts. Claims can (and should be) supported or refuted by logic and/or evidence, data and argument. Claims will often appear in topic sentences, thesis statements, and introductory and concluding sentences.

Activity

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=4834#h5p-62

Expressing a critical stance

A literature review is CRITICAL in stance, not purely descriptive. Your choice of words will:

- Reveal to the reader your attitude towards the research you are citing
- Indicate whether or not you consider their

claims to be substantiated

- Position your work in relation to the literature
- Develop an 'authoritative' or a 'researcher' voice.

Reporting Verbs

One way of signalling your critical stance on a source is through the use of attributive or reporting verbs. Reporting verbs refer to, or report on, a particular piece or body of literature. Their effective use helps in not only signalling the relevance of the sources to your writing but also strengthening your argument and indicating your stance towards a piece or body of literature.

The table below lists some common attributive/reporting verbs and indicates the stance they usually convey. This can be a neutral stance, a distancing or disagreeing stance, or a stance that implies agreement with the ideas or findings from a source.

Verbs that typically express a neutral, distancing or agreement critical stance		
Neutral	Distancing	Agreement
Suggest	Allege	Argue
Indicate	Declare	Establishe
Describe	Speculate	Affirm
Observe	Contend	Confirm
Comment	Claim	Show*
Maintain	Assert	Convince
Report	Postulate	Demonstrate
Show*		Emphasise

*Note that the verb 'show' can indicate either a neutral or agreement stance, depending on the context in which it is used in a sentence.

Activity

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=4834#h5p-61

Using tense in reporting verbs

Indicating your critical stance can be achieved through not only your choice of reporting verb (as suggested above) but also the tense you use on that verb. This is because the tense used in reporting verbs signals more than simply when something happened: It can show if you think the ideas of the reported research are current or still relevant to today.

Here are some general patterns of tense use in reporting verbs. However, remember, reporting verb tense is complex and can vary, so check the literature in your field for guidance.

Also remember that the patterns of tense use described here apply only to reporting verbs and not to all verbs that may be found in your literature review.

Examples

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=4834#h5p-25

EXPLORE FURTHER

Congratulations on completing this module. We have explored the nature and functions of a literature review; the process of conducting it, including taking notes using annotated bibliographies; different options for placing

Photo by Austin Park on Unsplash

your literature review within your thesis; how to structure your literature review, including using matrices to organise ideas within its body; and how to style your literature review through language expressing authority in argument and a critical stance on the literature.

Further assistance

Individual assistance – For more assistance with writing your literature review contact the Library by submitting a Request Research Assistance form.

Literature reviews is a complementary Libguide to this online module.

The module <u>Strategies and Resources for Searching the Literature</u> explores key resources to use when literature searching and the features of developing an effective search strategy.

Further information and resources on writing your literature review can be found in the <u>Learning Lab</u>. You may also be interested in exploring some more learning activities related to <u>writing with authority in the Learning Lab</u>.

Learn more

You may also be interested in viewing the following two webinars recorded from the Library's PhD Up program (now called Research Plus).

1. <u>Literature reviews: Structure</u>(60 mins)
   This workshop discusses the nature and purposes of literature reviews and will help you develop the necessary strategies for structuring this important section of your research. It includes hands-on activities, excerpts of sample literature reviews, and strategies for ensuring effective literature review structures.

2. <u>Literature reviews: Style</u> (60 mins)
   This workshop will introduce you to key writing style features of literature reviews and will help you develop the necessary strategies for forging your academic identity through your writing style. It includes hands-on

activities, excerpts of sample literature reviews, and strategies for establishing your own critical voice.

Feedback

Your comments and suggestions on how we can improve this module will be appreciated. Please complete our [feedback form](#).

What's next?

You have completed this module on Writing the Literature Review? You can [return to the Research and Writing Hub](#) to choose another module to complete.

BECOMING A RESEARCH WRITER

Welcome to this RMIT University Library module which provides you with guidance and strategies to help you in your journey towards becoming a research writer.

The module is aimed at graduate researchers (PhD or Masters by Research) who are writing a thesis or dissertation and who may be interested in writing for publication or for a general audience.

We hope you find this module useful and stimulating! Enjoy!

Learning objectives

On successful completion of the module, you will be able to:

- Formulate a research question
- Understand the importance of premises and claims
- Understand how arguments and evidence work together
- Position yourself in your research
- Identify an effective thesis statement

This module should take you about 30 minutes to complete.

Work through each chapter using the navigation footer (i.e. previous/next) or use the contents page to select a particular section.

Please help us improve this module by taking a moment to complete the feedback form provided at the end.

WHAT IS RESEARCH WRITING?

The prominent socio-linguist and educator, Ken Hyland (as cited in Epting, 2018) stated that in academia, "we are what we write" (p. 561). As new researchers preparing to join the research community we learn that writing both communicates particular content and embodies the "routines of [our] social communities" (Hyland as cited in Epting, 2018, p. 561). This means that writing for research is an act of 'becoming' a researcher and a crucial step in take an esteemed place in a research community.

Cartoon by Studio tdes on thedailyenglishshow

It is important that as an aspiring research writer, you too engage in the norms and conventions that define research in your field. This includes but is not limited to writing and publishing and involves any other form of communicating and disseminating your work.

As Kamler & Thomson (2006) state in a well-known book titled, *Helping Doctorial Students Write: Pedagogies for Supervision:*

> "We see research writing as an institutionally-constrained social practice. It is about meaning making and learning to produce knowledge in particular disciplines and discourse communities" (p. 5).

In joining your own research community and establishing yourself as a researcher within that field, you too will be following the cultural norms and behaviours that are well-established in that field.

FORMULATING RESEARCH QUESTIONS

The role of researchers in any field of study, is to produce new knowledge either in areas where there is a lack of knowledge or by bringing a new interpretation to bear on established understandings in a particular field. In order to do this, a researcher (or a team of researchers) will pose a research question.

Photo by Tingey Injury Law Firm on Unsplash

Beginning with a research question is important because it focuses your work and helps keep a researcher on track. A research question is just that; a question that exists in relation to a gap in what we know or understand of a particular topic. Research questions can have different forms, but the function is the same.

Examples

Consider these common research question forms:

- Does vitamin D enhance immune system function? (does X impact on Y?)

- Why do so few women seek a career in the construction industry? What are the main barriers to career advancement? (reason plus explanation)

- Can nanotechnology replace traditional methods of prototyping in industry? (can X influence Y to benefit z)

- How can AI improve interventions during disaster management efforts especially during a bushfire? (can A enhance B, especially C)

Before formulating a research question to guide your work, you should understand how premises and claims shape the

questions we ask. This is because good research questions are informed by sound premises and claims.

Here is Professor James Arvanitakis speaking about the importance of formulating an effective research question.

How research questions can make or break your research project *(8:36 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/researchwritingmodules/?p=2499#oembed-1

[How research questions can make or break your research project](https://rmit.pressbooks.pub/researchwritingmodules/?p=2499#oembed-1) (8:36 mins) by Graduate Research School Western Sydney University ([YouTube](https://youtube.com))

WHAT IS A PREMISE?

In the previous section we saw that research has to be based in researchable questions, and that these can take many forms. In this chapter, we consider how research questions and the arguments or 'theses' they give rise to are based in premises.

Photo by David Clode on Unsplash

In academic research it is useful to think of a premise as a 'position' or belief that leads to a particular conclusion.

Example

"Marriage and the nuclear family is the backbone of a civilised society."

This idea may be popular or even fashionable in society at any given time, and it is a *premise* that many people ascribe to (as evidenced by the number of marriages and families). However, the *belief* that it is the best way or only way to organise society has been challenged time and again (most recently in the movement for equal marriage rights). It is also a premise, which when scrutinised (i.e. through the lense of divorce rates increasing across the latter half of the 20th century) often leads observers to a very different conclusion.

There are many examples of 'premises' such as the one given in the statement above, which when tested or analysed closely, may or may not stand up to their underlying beliefs.

What's so important about a premise?

According to the [San Jose State University Writing Center](#), "the most important part of any premise is that your audience will accept it as true. If your audience rejects even one of your premises, they will likely also reject your conclusion, and your entire argument will fall apart."

> For instance, if your audience accepts climate change and the premise that the world is experiencing the effects of man-made climactic change, the following statement will be easier to accept:
>
> ***Since the beginning of the industrial revolution, the earth has experienced a warming of 1 degree every 20 years.***
>
> However, if your audience does not accept the premise (perhaps they are executives from the fossil fuel sector) you will need to work harder to get your conclusions accepted.

Premises are fundamental to understanding how arguments

work, because arguments and the 'claims' they give rise to are always predicated in one or more premises. The next section considers what makes a good claim.

Check your understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=2501#h5p-64

WHAT IS A CLAIM?

Definition

A claim is a statement that presents an idea or series of ideas as arguments. Arguments therefore consist of claims, or another way to put it is, to say that claims are the building blocks of a good argument.

In research writing, claims will be the backbone that form a **thesis** or a **hypothesis** (here the term 'hypothesis' refers to the

Photo by Santiago Lacarta on Unsplash

argument that is evidenced within the scope of the work).

According to Heady (2013) "Claims are the points you want to prove, interpretations you want to offer, and assertions you want to make" (p. 74). Importantly, in academia claims are statements that can be supported by evidence.

Example

'Traditional classroom teaching is boring'

For example, claiming that traditional classroom teaching is boring is not a good claim because it lacks definition (what does 'traditional classroom teaching' actually mean? and how do we measure 'boring')? It may also be a 'sweeping statement' (meaning it's far too general in scope). However, claiming that "traditional teaching methods, like

didactic instruction, do not provide sufficient interaction with students and lead to poor learning outcomes" is a good argumentative claim, because it can be investigated and measured.

Characteristics of a good claim

In order to make effective claims it is important to understand the difference between **statements** and **sentences.** While a statement is also a sentence (in that it is a grammatical unit with subject, verb, object clause), not all sentences are statements (in other words, not all sentences consist of a stance or a position).

Examples

The following provides examples of the difference between sentences and statements. The statements present a stance or position about the topic under discussion. This is important to understand as all claims must consist of a stance towards the topic.

sentences	statements
Bulldogs are a common breed of dog. They originated in the British isles.	Bulldogs are a dangerous breed and should be regulated.
Fat is one of three macronutrients. The others being carbohydrate and protein.	Fat has been misrepresented as a leading cause of heart disease. New research challenges this finding.

Function of claims

The function of claims in academic writing is to provoke, analyse, or interpret rather than merely

describe or present facts. They can do this by affirming, acknowledging, confirming, or refuting the proposition being made. In this way, claims do the job of building an overall argument or thesis in a piece of work (i.e. each claim progresses the key argument). It is for this reason that claims will appear in topic sentences, thesis statements, introductory and concluding sentences/paragraphs.

Check your understanding

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https://rmit.pressbooks.pub/ researchwritingmodules/?p=2537#h5p-57

POSITIONING YOURSELF AS A RESEARCHER

Photo by Ethan on Unsplash

An important skill that all researchers develop is the ability to present research as an ongoing discussion amongst a group of scholars. When researching you will need to read widely and it may seem to you that your peers are often discussing the same thing. Sometimes the authors of these sources will explicitly know each others' work and reference one another in their own texts. This is common in research writing, where explicit conversations between different scholars are expected and valued.

Example

Note the way these researchers position themselves in relation to the work of others in their field

Critical literacy is **not synonymous** with critical thinking, **although** critical thinking is clearly part of critical literacy **[a]**. Critical thinking can be described as independent thinking that uses information as the starting point (Klooster, 2001) **[b]**. It often begins with questions, builds on reasoned arguments and can involve social thinking. **While this view** of critical thinking is participatory and metacognitive, **it remains** personal inquiry and **does not necessarily** require the reader to question the purposes of the text **[c]**. To be critically literate, **one must** move beyond individual response and personal discovery **to interrogate** the curriculum and the everyday world (Cardiero-Kaplan, 2002) **[d]**. Harste (2001) **asserts that readers must** question, redesign, and create

alternate worlds **[e]**. **They should disrupt** the commonplace, interrogate multiple viewpoints, focus on sociopolitical issues, and take action to promote social justice (Lewison, Seely Flint, Van Sluys, 2002) **[f]**.

In the passage above about 'critical literacy' the writers signal their approach to the topic by contrasting two very similar concepts. Statement [a] tells us what the concept isn't (note the use of the phrase *not synonymous with*) and go on to provide a nuanced definition with the use of *although*. Statement [c] signals the limitations of our understanding of 'critical thinking' (note the use of *it remains* and *does not necessarily*) and prepares the reader for the writers' position presented in the statements [d], [e], and [f]. (Also note, the use of other writers to give weight to these writers' position).

The next chapter provides another example of the way a researcher positions themselves within their field by identifying the gap in the field.

IDENTIFYING THE GAP

Research involves highlighting the questions that remain unanswered in your area of research. This is often referred to as 'identifying the gap' in the literature and tells the reader what areas need further investigation in your research area. Identifying 'the gap' in your research is fundamental to finding *your position* in an ongoing conversation by deciding how much you accept, question, or reject the claims that your sources make.

When you start to write about that research, you need to figure out how to signal that position, as you quote, summarize, or paraphrase from your sources.

Example

Read the following text and note the way the researcher identifies the gap in the research as a way of positioning themselves in the research field.

Antarctica 1922, State Library Victoria Digital Image Pool

This research project sets out to discover if an experience of Antarctica, specifically mine, could be interpreted through the creation of souvenirs and jewellery. Although Antarctica is considered to be a very remote place it has a long and significant history of science and exploration and most recently has become the destination for tourism **[a]**. However, unlike most tourist destinations Antarctica has not been memorialised through jewellery and souvenirs in the way of historic tourist locations in the world **[b].** Throughout Antarctica's history explorers have painted images and more recently

documented it through photography **[c]**. Whalers and fishermen have made their own representations of this isolated and uninhabited continent, however, none of these matches the proliferation of souvenirs that have been produced to provide memories and reminders of Europe for example during the times of the Grand Tour or the commonly available souvenirs of popular resorts, sites and locations today **[d]**.

Excerpt from Kirsten Haydon's dissertation Antarctic landscapes in the souvenir and jewellery (used with permission)

Check your understanding

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excluded from this version of the text. You can view it online here:
https://rmit.pressbooks.pub/researchwritingmodules/?p=2506#h5p-45

WHAT IS A THESIS STATEMENT?

A thesis statement is an essential component of ALL academic and research writing.

A thesis statement:

Photo by Will van Wingerden on Unsplash

- occurs early in a piece of written work (introduction)
- tells the reader what the purpose and scope of the work will be
- provides more than a mere description of the topic
- puts a 'wager' (i.e. a bet) on the topic by telling us what the significance of the research will be
- defines what will be investigated and what they think will be found (note, it's OK if the hypothesis is disproven once the data is in)

Descriptive thesis statements

Beware thesis statements that are too descriptive because they "do not investigate anything, critique anything, or analyze anything [...] they also do not invite support and argument from outside of the central text" (UW Expository Writing Program, 2007, p. 2). The problem with thesis statements that are merely descriptive is that they lack a 'stance' or an

argument. They are therefore difficult to support with evidence and to build an argument for.

Examples

The examples below would **not** make good thesis statements because they are too descriptive.

> a) Shakespeare was a famous playwright during the Elizabethan era. He wrote numerous plays and poems.

> b) Almost one in two marriages in Australia end in divorce. That means the divorce rate is almost 50%.

> c) Covid-19 was a virus that caused an epidemic in the early 2020's.

Check your understanding

Where is the thesis statement in the passage below?

My intention was to investigate and portray Antarctica through my own and others' personal experiences, through historical examples of jewellery and souvenirs and through experimentation in the studio-based manufacture of new jewellery and souvenirs**[e]**. The objects produced through this research would reference the valued jewellery and souvenirs now displayed in museums as historical artefacts which were once personal mementos**[f]**. I was particularly interested in the potential of these objects to represent personal narratives and experiences of the past **[g]**. In this research project I have explored some of the ways in which I can make objects, specifically jewellery and souvenirs that draw on this rich heritage to present Antarctica in an innovative way **[h]**.

Excerpt from Kirsten Haydon's dissertation Antarctic landscapes in the souvenir and jewellery (used with permission)

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=2508#h5p-44

EXPLORE FURTHER

Congratulations on completing this module. We looked at the way research writers use premises and claims to build arguments in academic writing. We also covered the importance of

Photo by Austin Park on Unsplash

positioning your own work by identifying the gap in the field and we looked at the significance of thesis statements and why they are essential in research.

Further assistance

Individual assistance – For more assistance with your writing, make a time to see an Academic Skills Adviser in the Library by submitting a Request Research Assistance form.

The module Developing an Effective Research Proposal explores formulating research questions in more depth.

This 50 minute recording of a Research Plus session on Literature Reviews covers how to position yourself in the literature.

Further information and resources on developing academic writing can be found in the Learning Lab. You may also be interested in exploring some more learning activities related to writing with authority in the Learning Lab.

Learn more

For more on how to write an argument in research writing, consult the following resources:

- Thesis Whisperer How to Create Authoritative Voice in your Writing.
- Virginia Wesleyan University How to Create a Strong Thesis Statement
- Washington University Claims, Claims, Claims

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Kamler, B and Thomson, P. (2006). *Helping Doctoral Students Write. Pedagogies for supervision*. Routledge.

Feedback

Your comments and suggestions on how we can improve this module will be appreciated. Please complete our [feedback form](#).

What's next?

You have completed this module on the Research Proposal. To choose another module to complete, you can return to the Research and Writing Hub.

PUBLISHING A JOURNAL ARTICLE

Welcome to this online module related to publishing a journal article. Applying strategic measures when considering publishing, promoting and tracking your research is an important component of

Photo by Jani Kaasinen on Unsplash

being an academic researcher and it will have a significant impact on your standing as a researcher.

This module will introduce you to the **three Ps** of preparing for a publication:

- **P**lanning including setting objectives and selecting a publication source

- **P**ublishing issues such as open access, discoverability and writing tips
- **P**romoting and tracking your research and publications.

Learning Objectives

On successful completion of this module, you will be able to:

1. Recognise the key criteria in evaluating suitable publications to meet your publishing objectives, including relevance, quality and discoverability
2. Discover the benefits of and options for open access publishing

3. Recognise the warning signs of potential unethical publishing practices
4. Discover effective ways to navigate the submission and peer review process
5. Identify strategies for promoting your research publications.

This module should take about 30 minutes to complete.

Work through each section using the navigation footer (i.e. previous/next) or use the contents menu to select a particular section.

Upon completion, please take a moment to complete the feedback form to let us know how we may improve this module in the future.

You may also be interested in viewing the webinar Strategic Publishing recorded from the Library's 'PhD Up!' program (now called Research Plus) and the associated library guide on Strategic publishing. These are both available in the Explore further section at the end of this module.

PLANNING WHERE TO PUBLISH

Setting objectives

Photo by Clay Banks on Unsplash

So, you are undertaking your research and are starting to consider where you will publish. To make this decision it is worth spending some time thinking about why you want to publish. For example, is it to:

- build a publishing record?
- contribute to new knowledge?
- disseminate research findings?
- increase your research profile or impact?

Activity

Watch this video in the section below, of Dr Anne Jamison, a lecturer and researcher from the Western Sydney University, talking about the publishing process.

While watching have paper and pen ready and write down your three main reasons for deciding to publish your research.

Getting published: a researcher's guide *(12:22 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://rmit.pressbooks.pub/researchwritingmodules/?p=1881#oembed-1

Getting published: a researcher's guide (12:22 min) by Graduate Research School Western Sydney University (YouTube)

Which type of publication should you choose?

It is important to select a suitable type of publication for communicating your research, so consider which is the most appropriate forum.

Depending on your discipline, the following types of publications may be suitable for your research:

- Articles in **peer-reviewed journals** are generally well regarded in all subject areas, and are often the most prominent method for communicating research.

Photo by Maarten van den Heuvel on Unsplash

- **Books**and **book chapters**are considered favourably for researchers in most disciplines, and feature prominently insocial sciences, humanities, art, design, media and communications.
- **Conference papers** are often the most widely valued in computer science.
- **Other media** might also be appropriate for writing about your research. For example, an article in *The Conversation* or a post on a relevant blog could provide excellent forums for reaching a wider audience.

Each of these publication types are appropriate for a particular purpose. **The focus of this module is publishing a journal article.**

Further publishing considerations

Further important considerations to take into account for your situation when publishing:

- Do you have co-researchers or co-authors? Are there any issues relating to the authorship of your publication that you need to consider or resolve? See this <u>article on authorship</u> (login required) from the RMIT Researcher Portal.
- How long does the process take from submission to publication? Will this be important to you and your co-authors?
- Are there any copyright implications relating to the publication of your research output?
- Do you have any funding requirements that will impact on where you publish? For example, are you required to publish open access?

RELEVANCY, QUALITY AND DISCOVERABILITY

There are a range of methods and tools that can be used to identify **relevant** journals within subject areas, such as journal lists.

An indication of a journal's **quality** is whether the journal conducts peer reviews on submitted journal articles. Not all articles within a peer reviewed journal will be refereed, the process by which papers are reviewed

Photo by Evelyn Céspedes on Unsplash

for their quality by recognised academics or experts in the field before they are accepted for publication. For example, editorials, opinion letters, etc. are not peer reviewed. Universities require research publications to be peer reviewed. For more information about the eligibility criteria for a journal article to be included as a research publication at RMIT refer to the RMIT Researcher Portal.

When selecting a journal, consider whether your **target audience can find your work**, possibly make your article open access.

Criteria for journal selection

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=3911#h5p-49

Consult the Strategic publishing library guide for more information about assessing a journal for publication.

Watch the following video where Professor James Arvanitakis talks about some of the key tips to set you on the right path when it comes to publishing an academic journal article.

7 tips for getting your first journal article published
(3:05 mins)

> One or more interactive elements has been excluded from this version of the text. You can view them online here:
> https://rmit.pressbooks.pub/researchwritingmodules/?p=3911#oembed-1

7 Tips for Getting Your First Journal Article Published (3:05 mins) by Graduate Research School Western Sydney University (YouTube)

Test your knowledge

> An interactive H5P element has been excluded from this version of the text. You

can view it online here:
https://rmit.pressbooks.pub/
researchwritingmodules/?p=3911#h5p-52

SELECTING AN OPEN ACCESS JOURNAL

What is an open access journal?

Open Access journals (or OA journals) are electronic-based journals that make their published content available freely to all immediately upon publication. They differ from traditional journals (toll access journals) in that their business model is not based on subscriptions, i.e. readers are not charged fees to access the journal's content. For this model to work, authors can be charged an Article Processing Charge (APC), to move the cost from the readers to the authors.

Refer to the Open access publishing guide as it introduces open access, its benefits, the different models, APCs, policies and resources, and open access @ RMIT University.

Benefits of open access

The following infographic outlines the benefits of open access publishing, including:

- more exposure for your work
- practitioners can apply for your findings
- higher citation rates
- your research can influence policy
- the public can access your findings
- compliant with grant rules
- taxpayers get value for money
- researchers in developing countries can see your work

Open access models

Gold open access

Publish in a fully open access journal. This route may involve a charge but ensures immediate and permanent access to the work. The publication cost, known as an APC (Article Processing Charge), is either covered by the author/s or maybe their institution. Some researchers, intent on ensuring open access for their work, include anticipated APC costs in their list of funding requirements in grant applications. A list of fully open access journals can be found on the DOAJ website.

Image: "Gold open access logo" is in the Public Domain, CC0

Hybrid open access

Publish in a 'hybrid' journal. These journals are subscription journals that allow open access for individual articles on payment of a fee (APC). This fee is payable by the author/s or maybe their institution. Note: Some journal websites will refer to this option as Gold Open Access as the content is immediately available, but true Gold Open Access refers only to a publication in a fully open access journal.

Image: "Hybrid open access logo" is in the Public Domain, CC0

Green open access

Publish in a subscription-based journal with the full-text deposited into a trusted repository, i.e. a publicly accessible

database managed by a research institution (such as RMIT's [Research Repository](#)). This route relies on publishers allowing an author to share an earlier version of the work, whilst the publisher maintains ownership of the final published version.

Image: ["Green open access logo"](#) is in the [Public Domain, CC0](#)

Mandates

The Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) Open Access policies aim to ensure that the discovery of publicly funded research is made available to researchers and the wider community. Refer to the Library guide for [Open Access Publishing](#) to see details regarding the ARC and NHMRC policies.

Copyright and open access

The copyright holder for published research works usually sits with either the author, or the publisher, depending on the author/publisher agreement.

The [SPARC Author Addendum](#) can be used to legally modify a publisher's contract so that an author can retain the rights needed to both promote their research publications and achieve publishing goals. Using the addendum would allow an

RMIT researcher to publish an accepted manuscript version of their publication in the RMIT Research Repository. Presently, RMIT does not have university wide policy or position on the negotiation of contracts with journals.

The Australian Open Access Support Group provides advice on the copyright implications of open access and the retention of copyright. The University's Copyright Service can also provide further advice.

Finding open access journals and open access policies of publishers

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DOAJ: Directory of Open Access Journals

The DOAJ lists 9000+ journals. It aims to cover all open access scientific and scholarly journals that use a quality control system to guarantee the content. It can be searched or browsed by title, subject, country, license or publication charges.

SHERPA/RoMEO – Publisher copyright policies & self-

archiving

Search by journal title, ISSN or publisher to check publisher policies and for a summary of permissions to archive a version of the paper in an open access repository, including embargo conditions.

Read and publish agreements

The Library has signed up to a number of transformative agreements to support open access publishing. These *Read and Publish Agreements* repurpose existing expenditure to include both subscription fees and open access publishing fees. When publishing in journals covered by these agreements, you may be able to publish directly to open access with no transactional **Article Processing Charges (APCs)**. Submit your publications as usual. If the Library has an agreement in place, the publisher will alert you to an open access option on acceptance of the eligible article. Exclusions and caps apply to some journals. More information about Read and Publish Agreements, including the publishers and journals.

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=1890#h5p-53

UNETHICAL PUBLISHING PRACTICES

The world of publishing has seen an increasing number of publishers that exist somewhere in between the world of reputable publishing and 'unethical' publishing.

Photo by Nicole Mason on Unsplash

Confusion has occurred with the emergence of 'gold' open access publishing, which is a legitimate model of paying for publication. However, the journal's impact may be be limited because it does not have the reach or visibility of mainstream publications, or well known publishers.

Watch out for journals which:

- have a name that is similar to other

established journals or academic institutions

- publish articles on subjects not normally associated with the discipline
- send unsolicited emails which contain errors, are extremely complimentary or the journal is not in the researcher's discipline

Publication source considerations

	Reputable publishing practice	**Signs of potential problems**
Content	Publishes quality research that you would read and use.	The journal promises to publish all content.
Organisational affiliation	You can identify and contact any affiliated organisation.	There is no clear organisational affiliation.
Editorial processes	Has clear editorial policies and peer review processes.	The editorial process is unclear.
Peer Review	Is listed in the Ulrichs directory as a peer reviewed journal.	Does not undertake a peer review process.
Publication fees	Has clear information about publication fees.	Publication fees are undisclosed or difficult to find.
Editorial board	The names and affiliations of editorial boards are clearly visible.	It is unclear who is on the editorial board. The same editors are on numerous journals.
Indexing	Is indexed in standard databases in the subject field.	Not indexed in the standard databases.
Citation impact	Mention of citation impact factor comes from standard sources such as JCR, Scimago or Scopus Sources.	It makes unverified claims regarding citation impact. The sources are not the standard ones.

Further readings

Information and readings about deceptive publishing practices are available on the Library guide [Strategic publishing](#).

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=1892#h5p-20

SUBMITTING YOUR ARTICLE FOR PUBLICATION

The previous sections have discussed the process of planning and choosing an appropriate journal for your article based on considerations of the relevancy, quality and discoverability of the journal. They have also pointed to alternative publication options such as open access publishing.

Once you have determined the most appropriate journal and you

Photo by Jaredd Craig on Unsplash

have written a draft of your text, you need to ensure that your article will be acceptable for submission to the journal.

Before submission

Before submitting your article, make sure that it meets the **journal requirements**.

- Carefully re-read the aim and scope of the journal to ensure that it is the right fit for your paper.
- Follow the journal's instructions on formatting and style including referencing. These usually appear on the journal webpage under such titles as "Instructions for Authors".

Also ensure that your publication meets your **research responsibilities**.

- Your work needs to be a substantial and original contribution to the field and should adhere to principles of research

integrity.

- The [Australian Code for the Responsible Conduct of Research](#) guides researchers in responsible research practice.

Finally, make sure you **proofread** your article thoroughly. You can proofread your article yourself, use a proofreading service, or ask a friend or colleague to read your article to avoid 'writer's blindness' that can occur due to over familiarity with the text.

If you are doing your own proofreading, use a strategy that works for you. Popular proofreading strategies include:

- Reading the paper slowly and out loud. This strategy allows you to hear as opposed to simply skim through what you have written.
- Reading the text backwards. This strategy enables you to pick out errors which you may automatically fix in your mind when reading the text as usual.
- Making a list of errors that you commonly make and proofread for only one type of error at a time. This strategy helps you focus on your known errors and address them one at a time.

During submission

Once the article is ready for submission, follow the journal's instructions on how and where to submit. Most journals have a submission portal on their website where you are usually asked to set up an account.

Within the portal, peer-reviewed journals commonly ask you to submit the full manuscript in addition to a blind-review version which removes any reference to author identity. They may also require additional documentation such as:

- an abstract
- a conflict of interest statement
- a brief auto-biography
- a cover letter to the editor.

Make sure you check these requirements and allow ample time for the submission process.

Post submission

Once authors have submitted their article and other required documentation, they usually receive automatic electronic confirmation of their submission.

Following this, a journal editor may also be in touch to

inform you about the receipt of your article and whether they have considered it for subsequent peer review.

Further resources

If you would like to find out more about the mechanics of writing a publishable journal article, please consult the following resources:

- Glasman-Deal, H. (2010). *Science research writing.* Imperial College Press.
- Kamler, B. & Thomson, P. (2014). *Helping doctoral students write : Pedagogies for supervision.* Taylor & Francis.
- Soule, D. P. J., Whiteley, L. & McIntosh, S. (2007). *Writing for scholarly journals.* eSharp.

NAVIGATING THE PEER REVIEW PROCESS

Peer review is a process that is undertaken by credible scholarly journals to ensure the content published is of a high academic standard. Journal editors select subject experts who evaluate submitted text for research rigour and for its suitability for publication.

Photo by Mick Haupt on Unsplash

Another way of thinking about peer review is that it is a process that can improve the quality of your work. It is an opportunity for you to see your article through the eyes of experts and peers in the field, and to critically reflect on its content in order to strengthen it. Even Nobel Prize winning papers will be carefully reviewed!

Types of peer review

Journals can utilise different types of peer review. The three most common types are:

1. **Double-blind peer review**: The identity of both authors and reviewers is anonymous. This is the most used and often prestigious type of peer review.
2. **Single-blind peer review**: The identity of reviewers is anonymous.
3. **Open peer review**: The identity of authors and reviewers is known to both parties.

The peer review process

The peer review process usually consists of the following steps:

Steps	Detail
1. Submission	Journal editors receive submission and make a decision as to whether it goes to peer review.
2. Screening	If the article is deemed acceptable for peer review, journal editors would then contact relevant experts. If not, journal editors would typically inform the author(s) of their decision.
3. Reviewers assigned	Usually two peer reviewers carry out the evaluation of the paper and are given some guidelines and a timeframe for carrying out the task.
4. Reviewer assessment	Once the peer reviewers have assessed the paper, they let the editors know of the outcome of their review and send accompanying comments / feedback for the author(s). Sometimes, if the two reviewers disagree as to whether the article should be published, the editor may seek the opinion of a third reviewer.
5. Peer review outcome	The author is notified if the publication has been rejected or accepted (subject to any revisions required).

The above common peer review steps are illustrated in the following video.

ANU video on the peer review process (03:18 mins)

One or more interactive elements has been excluded from this version of the text. You

can view them online here:
https://rmit.pressbooks.pub/
[researchwritingmodules/?p=2968#oembed-1](https://rmit.pressbooks.pub/researchwritingmodules/?p=2968#oembed-1)

[Peer Review Process](#) (03:18min) by ANU University LIbrary ([YouTube](#)).

The typical turn-around time for peer review is 14 weeks. If you have not heard back, re-check the journal for expected response time and allow 2 more weeks before tactfully emailing the editor.

Do **not** send your paper to another journal until you have a response. Use the waiting time to work on other tasks (e.g. writing another paper).

Peer review outcomes

Once peer reviewers have evaluated your work, they usually send their assessment to the journal editor. The journal editor in turn considers the peer review evaluations and notifies you of the final outcomes for the paper. These can be:

1. Yes – we'll publish this paper and no changes are needed. (Accept)
2. Yes – we'll publish this paper subject to some minor changes in line with reviewer comments. (Accept subject to minor changes)
3. Maybe / No – we won't publish this in its current form. However, if major changes are made in line with reviewer comments, we might. (Reject and Resubmit)
4. No – we won't publish this under any circumstances. (Reject)

For many high-ranking journals, the first outcome is rare while the fourth (the" Reject" response) is extremely common.

Responding to reviewers' comments

In most cases, if your article has been accepted for publication, it will require making changes (major or minor) that respond to reviewers' comments.

Here are a few recommendations when responding to these comments:

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https://rmit.pressbooks.pub/ researchwritingmodules/?p=2968#h5p-54

The following table provides you with a template that you can use in responding to reviewers' comments.

	Reviewer Comments	**Author Response**
Reviewer 1	1. ...	
	2. ...	
	3. ...	
Reviewer 2	1. ...	
	2. ...	

Dealing with rejection

Remember, rejection of publication happens to everyone.

Consider yourself in good company – *Animal Farm*, *Gone With the Wind* and *Harry Potter* were all rejected multiple times before they were published!

Rejection can also be a very useful learning process, even if it hurts!

It is equally important to know that, despite publication rejection, you still have a number of choices available. You can:

- Submit your article to another journal
- Revise and resubmit the article to the same journal
- Revise and resubmit the article to a different journal
- Appeal the decision
- Abandon the article (for now)

Further resources

For more information on the peer review process:

- Watch this RMIT Library Researcher Spotlight session on "What's in a Peer Review". (Microsoft stream, login required).
- Read this article from *The Conversation* which explains the typical steps in the peer review process.

COMMUNICATING AND SHARING YOUR RESEARCH

It is worthwhile considering what methods and communication channels you will use to share your research. Listed below are some common methods for communicating research

Photo by Tony Stoddard on Unsplash

with a range of audiences – academic, professional and general.

For academic purposes, share your research via these methods to increase the likelihood your research will be viewed, downloaded and cited. This will enable you to measure the impact and engagement of your work.

Researcher profiles

Creating and maintaining researcher profiles can foster connections with your research community, and maximises the visibility of your research outputs and impact. All RMIT

researchers and HDR students are encouraged to have an ORCID profile. An ORCID profile can be used to display your research interests and activities, list your publications, qualifications and achievements, and link to other research and professional profiles. Some journals require researchers to provide their ORCID identifier when submitting articles for publication.

See the Library's guide on Researcher Profiles and ORCID iDs for more information on ORCID and other profiles. Alternatively, explore the module Setting up your researcher profile.

Blog, tweet, and post about your research

Consider writing a blog to share your research, or create a professional or academic Twitter or LinkedIn profile to connect with other researchers, share ideas and post links to your research writing and publications. Remember to include a DOI (Digital Object Identifier) when posting about your work – this will help you track citations, views and downloads. For more information regarding sharing using social media see the Library guide Social media for researchers.

For HDR Candidates

See the [Thesis Whisperer](#) and [Research Whisperer](#) blogs – both excellent resources for research students and early career researchers. If you have a Twitter profile, consider following their Twitter accounts. If you don't use Twitter, consider signing up to the mailing list for either blog.

Watch this video for a brief introduction to using social media when communicating your research.

Communicate your research (2:14 mins)

One or more interactive elements has been excluded from this version of the text. You can view them online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=1898#oembed-1

Share your research data

Sharing your research data can be another method of promoting your research – the increased exposure may lead to new collaborations and new research projects with other researchers, or extra citations for your publications.

In some cases it may be mandated that you share your research data when submitting an article for publication. See the Library's guide to Research Data Management for advice on managing and sharing your research data.
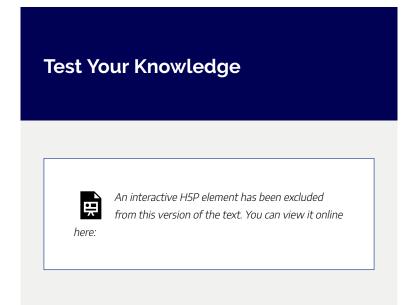
Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

[https://rmit.pressbooks.pub/
researchwritingmodules/?p=1898#h5p-23](https://rmit.pressbooks.pub/researchwritingmodules/?p=1898#h5p-23)

EXPLORE FURTHER

Congratulations on completing this module. We have explored a range of strategies and tools that can help in the process of selecting where to publish your research.

Photo by Kier in Sight on Unsplash

Further assistance

For more assistance in strategically planning your publications, consult the Strategic publishing library guide.

RMIT academic staff and research students can also contact the Library by submitting a research request form. (RMIT University login required).

Additional information and resources are available in the guides:

- Research evidence for grants and promotions
- Research metrics
- Open access publishing
- Researcher profiles and ORCID

- [Research data management](#)
- [Social media for researchers](#)

Learn More

You may also be interested in viewing the following webinar [Strategic Publishing (login required) (55 mins.)](#) recorded from the Library's PhD Up! program (now called Research Plus). The webinar content complements this online module.

The Researcher Capability Development has a suite of online modules, explore the offerings on [Publishing and communicating your research](#).

Feedback

Your comments and suggestions on how we can improve this module will be appreciated. Please complete our [feedback form](#).

What's next?

You have completed this module on Publishing a journal article. To choose another module to complete, you can return to the [Research and Writing Hub](#).

SETTING UP YOUR RESEARCHER PROFILE

Welcome to this online module on how to set up your researcher profile. Establishing a researcher profile is very useful for promoting and increasing the visibility of your research publications and other activities.

Photo by Ricardo Gomez Angel on Unsplash

The module provides an overview of commonly used researcher profiles and how to establish and maintain them.

Learning objectives

On successful completion of the module, you will:

- be familiar with the most commonly used researcher profiles
- know the benefits of researcher profiles
- be able to identify which profiles will be most relevant to you
- know how to create and maintain a researcher profile, as well as connect it to other online profiles.

The course materials include information, videos, and learning activities that explore key aspects of establishing your researcher profile.

This module should take you about 30 minutes to complete.

Work through each section using the navigation footer (i.e. previous/next), or use the contents menu to select a particular section.

Upon completion, please help us improve this module by

taking a moment to complete the feedback form provided at the end.

You may also be interested in viewing the additional resources about setting up a researcher profile in the Explore Further chapter at the end of this module. Provided is a webinar recorded from the Library's 'PhD Up!' program (now called Research Plus), along with the library guide on Researcher Profiles and ORCID iDs.

ABOUT RESEARCHER PROFILES

What is a researcher profile?

A researcher profile is the publicly accessible profile of your professional academic works and achievements. A researcher profile enables information about you, your work and career to be

Image by Coffee Bean from Pixabay

visible and accessible, encouraging collaboration, and providing measures of your impact and engagement. A researcher profile will bring together your research outputs on a single platform, making your work easier to find.

An **identifier** is a unique number (e.g. 16 digit ORCID iD), or persistent URL. Whilst a **profile** is the body of information that is associated with an identifier.

Benefits of a researcher profile

Each researcher profile has different strengths, together they can:

- increase the visibility of your research
- improve your chance of being cited
- improve your citation metrics
- ensure correct attribution, reducing the number of name variations
- connect you to new collaborators / funders
- increase your employment opportunities
- increase your standing within your field of study beyond RMIT University
- link your work from different sites to one place.

Types of profiles

Researcher profiles are an essential component of an academic career and there are a few types that can be created and interlinked.

This module will explore the common researcher profiles:

- ORCID iD
- Scopus Author ID
- Web of Science Researcher Profile
- Google Scholar Profile

ORCID: A MUST HAVE PROFILE

What is ORCID?

The ORCID iD, formed from the acronym **O**pen **R**esearcher and **C**ontributor **ID**entifier, is a unique identifier that distinguishes you from every other researcher. Unlike other researcher profiles, ORCID is controlled by you and can be a comprehensive reflection of your research.

Photo by Ramith Bhasuka on Unsplash

Use ORCID to display your:

- affiliation and employment
- research interests and projects
- invited positions, awards and prizes
- membership of academic or professional societies
- grant funding
- research outputs such as journal articles, books and book

chapters, conference papers, as well as other non-traditional research outputs (NTROs) such as creative works.

Example ORCID profile

Meredith Tharapos' ORCID profile is an example of how to add content to different fields.

When manually adding works into your ORCID profile, you should always first enter identifiers into the 'identifier value field' (this is the part that Altmetric looks at!) and not the 'identifier URL field. Usually, the identifier URL field will automatically be populated once you have entered the identifier value field.

ORCID iDs can also be used to connect with:

- publishers – ORCID iDs are often requested when submitting manuscripts and conference papers
- other online profiles such as your RMIT profile, LinkedIn, personal website, or database profile
- research funding systems such as the ARC's Research Management System (RMS).

Watch this video to discover more about ORCID iDs and the benefit of creating one for yourself.

What is ORCID? *(4:17 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/researchwritingmodules/?p=2323#oembed-1

What is ORCID? (4:17 mins) from ORCID on Vimeo.

Reflection

If you already have an ORCID profile how might you improve it?

What other information might you add to make your profile more comprehensive?

For HDR Candidates

Find an ORCID profile for a researcher at RMIT, maybe your supervisor's profile.

How could they improve on their profile?

What other information could they add to make their profile more comprehensive?

CHOOSING YOUR RESEARCHER PROFILES

There is a range of researcher profiles available, but which are best for you?

It is highly recommended that RMIT researchers have an ORCID iD. Please see the section ORCID: a must have profile for more details.

Photo by Alex Azabache on Unsplash

Beyond having an ORCID profile it can be confusing to decide which researcher profiles to use. Some considerations you might make include:

The purpose. Think about what you want from your profile. Are you using it to display your research outputs, calculate citations, network and share your work with other

researchers, identify collaborators or funding? If so, it may be worth maintaining a profile with Scopus or Web of Science (check if these index your papers first). For others it may be enough to have a Google Scholar Profile.

Which profiles are relevant? How are other researchers in your discipline using their profiles – which are the best for your discipline?

Consider how many profiles you can regularly maintain. Don't feel compelled to have all profiles! All profiles require significant time to maintain.

Scopus Author ID

Scopus is a comprehensive bibliographic database that provides impact metrics for documents and authors, and enables the tracking of research over time. Your **Scopus Author ID is created automatically** when your first publication is indexed in the Scopus database. It allows you to see a list of your publications and view citation metrics. You can also link your Scopus Author ID to your ORCID profile.

Web of Science Researcher Profile

Web of Science is another major citation database that

provides citation metrics for research publications and authors. A Web of Science Researcher Profile allows you to claim and showcase your publications, and once created, the profile will assign a unique identifier known as the ResearcherID. The profile allows you to display and manage your affiliation, manage your publications, track citations and create citation reports, as well as display editing and peer review work for journals.

Google Scholar Profile

Google Scholar is one of the major tools used to discover research publications. Setting up a Google Scholar Profile for yourself will make your publications easy to find.

Photo by Mitchell Luo on Unsplash

Google Scholar Citations allows you to create a profile and attach all of your Google Scholar publications and citations. It can also calculate your h-index and i10-index.

You can choose to make your profile public, so that it appears in Google Scholar results when people search for your name.

Comparing profiles

This table outlines some of the main features you may wish to consider when deciding which researcher profile you would like to use.

Researcher profiles comparison table

	ORCID	Google Scholar	Scopus	Web of Science
Publication list	Yes	Only those publications discoverable by Google Scholar	Only those publications included in the database	Only those publications included in the database
Non-Traditional Research Outputs (NTROs)	Yes	No	No	No
Citation metrics	No	Yes	Yes	Yes
Altmetrics	No	No	Some	No
Citation reports	No	No	Yes	Yes
Link with other profiles	Yes	No	Yes (ORCID)	Yes (ORCID)
Biography, affiliation, research interests	Yes	Yes	Affiliation only	Affiliation only
Awarded grants, invited positions	Yes	No	Some awarded grants	No
Link with publishers and funding bodies	Yes	No	No	No

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=2268#h5p-37

BUILDING YOUR RESEARCHER PROFILES

Register for an ORCID iD

Researchers at RMIT University should use the RMIT Registration tool for an ORCID iD (login required).

Complete the required fields: name, primary email and password.

Choose a visibility setting for your ORCID profile, either public, limited or private. The default setting is public. You might, however, choose to change this to private until you have

Photo by @charlybron on Unsplash

completed all of your profile details, such as employment and education, and added your citations.

Check to see if you have a Scopus Author ID

Go to [Scopus](#) (login required).

Do an Author Search on your name and your affiliation e.g. *RMIT University*. It may also be worth searching with previous affiliations. Did you find a record for yourself?

Make a note of your Author ID so that you can add this to your ORCID profile.

You can also get citation alerts and request corrections of your details in Scopus using this ID number. Further information on how to make corrections to your Scopus Author ID can be found in this [blog post](#).

Register for a Web of Science Researcher Profile

First, to create a Web of Science Researcher Profile you will need to register for a Web of Science account at [webofscience.com](#). Use your RMIT email address to create the account and add an additional email address in the account settings.

After logging in to your Web of Science account, select the 'Researcher Profile' link on the left side navigation panel. This will display your researcher profile information, and will allow

you to claim and add publications, link with ORCID, create citation reports and manage your peer review activity.

Further information on how to make changes to your researcher profile can be found at the [Web of Science help page](#).

Create a Google Scholar Profile

1. Go to [Google Scholar Citations](#) and sign in with your **private email account** details. Google recommends that you use a private email address when creating your profile. That way, your profile can travel with you if you leave RMIT.
2. Enter your name and your affiliation (i.e. RMIT University). **Make sure you enter your RMIT email address in the email verification field.** This will ensure that your profile is eligible for inclusion in search results. If you do move university you can easily update this address.
3. On the next page, add your publications to your profile.
4. Choose to have either automatic updates applied to your profile or to review them beforehand.
5. When satisfied with the results, make your profile public.

For more information see the Google Scholar Citations [help page](#).

CONNECTING EVERYTHING WITH ORCID

Connecting Scopus Author ID and ORCID

You can connect your Scopus Author ID to your ORCID so that your profile will be automatically updated with new publications.

Connecting Scopus Author ID and ORCID can

Photo by Vincent Guth on Unsplash

be done either in ORCID or in Scopus. You can choose either of the following options to link Scopus Author ID and ORCID.

Option 1: Link Scopus Author ID from your ORCID profile

1. Login to [ORCID.](#)
2. In your ORCID record, go to the Works section, 'Add works' and 'Search & link.'
3. Select Scopus Elsevier from the list and authorise.
4. Follow steps to associate your Scopus Author ID and works with ORCID.

Option 2: Link ORCID from your Scopus Author ID

1. Go to [Scopus Author search](#) (login required).
2. Search by your name and RMIT University in the Affiliation field.
3. Click on your name in the results list to open your profile page. (*Note* you won't find an an Author ID if you don't have works already indexed by Scopus).
4. If you do have Author ID, Click on 'Add to ORCID' on the right-hand panel.
5. Follow the steps to associate your Scopus Author ID with your ORCID profile.

Connecting Web of Science

Researcher Profile with ORCID

You might have associated your Web of Science Researcher Profile with ORCID when you set it up. If not, you can do this at any point.

Note: that before you can do this your ORCID profile needs to be set to 'public'.

Connect Researcher Profile with ORCID

1. Log in to your [Web of Science](#) account.
2. Go to 'Profile Settings' (located top right of screen under your name drop-down).
3. Select the 'ORCID Syncing' tab.
4. Select the 'Connect your ORCID ID' button to link both profiles.
5. Next, sign in to ORCID.
6. Confirm your sign in details and select the 'Authorize access' button.
7. This process will revert to the Web of Science profile settings menu and display your linked ORCID iD – you can toggle syncing and permission settings between profiles.
8. Publications imported from ORCID will now display

on the main Researcher Profile page and on the 'My publication records' page (access via the '+ Add publications' button).

Enable syncing between Web of Science and ORCID

- In the Web of Science Researcher Profile menu, select 'Edit' next to your name.
- Select the 'ORCID Syncing' tab and choose the options to:
  - 'Update ORCID with changes I make in my Web of Science Researcher Profile' and
  - 'Update my Web of Science Researcher Profile with changes I make in ORCID'.

Note: If you have undertaken peer reviews, you may want to select 'Update ORCID with my peer reviews'.

Adding Google Scholar citations to ORCID

To add your articles from Google Scholar Citations into your ORCID profile you will need to create a BibTeX file in Google Scholar and import this into your ORCID record.

Follow these steps:

1. Go to your [Google Scholar Citations](#) profile page.

2. Select works to be exported.

3. Click export, select BibTeX and save the file.

4. Go to ORCID, login and go to your record.

5. Click Add Works and select Import BibTeX and select the file you saved in Google Scholar.

MANAGING YOUR RESEARCHER PROFILES

Managing your researcher profiles will enable you to effectively track engagement with your research outputs, and enable you to benchmark your performance against other researchers.

Photo by Brett Jordan on Unsplash

Once you have decided which profiles are suitable, and created and added information to those profiles, there are a few considerations to keep in mind.

Time commitment

Maintain your profiles regularly to ensure they are accurate, current and complete.

Risk management

Privacy – only share information you are happy for others to see.

Copyright and publishing agreements – check that you only share information that you can legally disclose to others.

Security – review the user agreement of each profile tool so that you know who accesses your data, how it is stored and what you can control.

Measuring impact

Citation metrics provided by the following researcher profiles are one way of measuring impact:

- Scopus Author ID
- Web of Science Researcher Profile
- Google Scholar Profile

These citation tools are limited as no single tool can provide a comprehensive measurement of research publication impact. They only gather metrics on the publications that they index. Citation counts should be used with other qualitative measures. **Altmetrics** (alternative metrics) provide insights into what is being said about research in non-scholarly forums (e.g. social media). Read more on the Altmetrics library guide.

Other key profile tools

The module has addressed the most common researcher profiles: ORCID, Scopus Author ID, Web of Science Researcher Profile and Google Scholar Profile.

You might consider other profiles tools:

- University profiles: RMIT staff profiles
- Social media: Twitter, LinkedIn, blogs
- Communities: Academia.edu, ResearchGate
- Dissemination: RMIT Research Repository, *The Conversation*, your email signature

There is much to consider when using social media. Engaging with social media enables you to promote and track your research to a wider audience. The [Social Media for Researchers](#) library guide introduces platforms and provides tips to maximise social media usage. Relevant university policies and guidelines, as well as copyright information are included.

Which researcher profiles will you use?

There are many considerations when deciding which researcher profiles will benefit you. Before creating any researcher profiles, consider:

- What is the purpose of the researcher profile and does it suit you?
- Which profiles are the most relevant for your research discipline?
- How many profiles can you regularly maintain?

EXPLORE FURTHER

Congratulations on completing this module. We have explored some common tools used to create author profiles and identifiers. These allow you to bring together and link your research outputs.

The module included setting up an ORCID iD, which acts as a universal identifier, and linking ORCID to other identifiers such as Scopus Author ID, Web of Science Researcher Profile, and your Google Scholar Profile.

Photo by Markus Spiske on Unsplash

Further assistance

Individual assistance – For more assistance in setting up your researcher profiles contact the Library by submitting a Request Research Assistance form.

Library guide – Additional information is available from the online library guide Researcher Profiles and ORCID.

Learn more

You may also be interested in viewing the webinar recording Bringing your researcher profiles together with ORCID (46 mins).

The Researcher Capability Development has a suite of online modules, explore the offerings on Impact.

Feedback

Your comments and suggestions on how we can improve this module will be appreciated. Please complete our feedback form.

What's next?

You have completed this module on Setting Up a Researcher Profile. You can return to the Research and Writing Hub to choose another module to complete.

ARE YOU BEING CITED?

Welcome to this online module *Are you being cited?* The number of times your work has been cited by other academics and writers is one indication of your research impact. However, there are other qualitative measures of the value and impact of your research. This module will introduce you to the traditional and non-traditional ways of measuring research impact.

Photo by Ralph (Ravi) Kayden on Unsplash

Learning objectives

Completing this module will help you:

- understand the concept of academic research impact
- become familiar with traditional and non-traditional measures of impact (i.e. academic and societal)
- understand how academic research impact can be measured
- identify and use databases to track bibliometrics and altmetrics to measure research impact.

The course materials include information, videos, and learning activities that explore the tools that you can use to find quantitative and qualitative measures of your research impact.

This module should take you about 30 minutes to complete.

Work through each section using the navigation footer

(i.e. previous/next), or use the contents menu to select a particular section.

Upon completion, please help us improve this module by taking a moment to complete the feedback form provided.

You may also be interested in viewing the additional resources about *Are you being cited?* in the Explore Further chapter at the end of this module. Provided is a webinar recorded from the Library's 'PhD Up!' program (now called Research Plus) along with the associated library guides on Research metrics and Altmetrics.

WHAT IS RESEARCH IMPACT?

Definition

Research impact can be defined as the contribution the research makes to a particular academic field, as well as the benefits of the research on individuals, organisations, and society as a whole (i.e., non-academic impact).

Photo by Deniz Altindas on Unsplash

In today's world, it's becoming increasingly important to measure and describe the real world significance and reach of research.

The [Australian Research Council](#) provides a definition of research impact as follows:

"Research impact is the contribution that research makes to the economy, society, environment or culture, beyond the contribution to academic research."

Types of research impact

In categorising the types of research impact consider *who benefitsand how*.

The University College Dublin outlined in their [Research Impact Toolkit](#) that impact may be categorised as **academic impact** (the contribution the research makes to academia), as well as **societal and economic impact** (the contribution the research makes to society and the economy, and the benefit to individuals, organisations and nations).

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https://rmit.pressbooks.pub/ researchwritingmodules/?p=2723#h5p-40

The text from the defining impact image from "What is impact" is used with permission from University College Dublin. The text from this menu is under copyright from the University College Dublin and is not to be reproduced without permission.

How is research impact measured?

Research metrics are numerical measures used to assess the quality and the impact of research. There are two main types of metrics:

1. **Bibliometrics** – Traditionally, research impact has been measured using bibliometrics. Bibliometrics are quantitative measures providing a statistical analysis of outputs and include citation counts, h-index, and journal impact factor. They support the traditional written output.
2. **Altmetrics** – are qualitative measures that track

mentions of academic research outputs – including non-traditional research outputs such as reports, creative works and *The Conversation* articles – in a range of resources such as social media, patents, policy papers, and news stories. Altmetrics can offer a more comprehensive view of research impact beyond traditional bibliometrics.

How is research impact used?

Research impact can be used in several ways, including:

1. Institutions use research impact measures, including bibliometrics, to show their research contribution.
2. Funding bodies may use impact measures when assessing grant applications.
3. Individuals can be assessed by their research impact in situations such as recruitment, promotion and grant applications.

Watch the following video to find out more about the broader context of research impact and why it's important.

Research impact – University of Leicester *(2:08 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:
[*https://rmit.pressbooks.pub/*](https://rmit.pressbooks.pub/)
[*researchwritingmodules/?p=2723#oembed-1*](https://rmit.pressbooks.pub/researchwritingmodules/?p=2723#oembed-1)

[Research impact](#) (2:08 min) by the University of Leicester ([YouTube](#))

Reflection

Take a moment and consider how your research has impacted in academia and in non-academic circles.

- What has been the contribution in a field of study?
- How has the new knowledge been adopted and adapted to inform further research and understanding?

- What has been the societal impact of the research?
- Has it informed policy and practices?
- What contribution has the research had on the economy and technological advancements?
- How has it impacted individuals, organisations and all nations?

ABOUT BIBLIOMETRICS

What are bibliometrics?

Bibliometrics measure academic impact by focusing on scholarly citation analysis within the scholarly literature.

Bibliometrics are **quantitative** research impact assessment tools that use citation data to indicate

Photo by sylvie charron on Unsplash

the likely contribution a paper or author is making to the advancement of knowledge in a particular area.

In contrast, altmetrics aim to provide **qualitative** analysis of research by analyzing the attention papers and other works are receiving in the broader, non-scholarly world, thereby indicating the contribution of the research to public policy, real world problems and other societal issues. Explore the 'About Altmetrics' section of this module to learn more.

Citation data can be located using scholarly databases such as Scopus or Web of Science, and research analysis tools such as SciVal and InCites. These databases and tools allow you to track and analyse citations by:

- Identifying who is citing your work.
- Listing the number of times your publication has been cited in later publications.
- Placing the citation count in context within a field – e.g., using measures such as Field Weighted Citation Impact (FWCI).
- Providing other measures of your impact such as the author h-index.

Watch this video to gain an overview of bibliometrics.

Bibliometrics in under 2 minutes (1:36 mins)

One or more interactive elements has been excluded from this version of the text. You

can view them online here:
https://rmit.pressbooks.pub/
researchwritingmodules/?p=2798#oembed-1

Bibliometrics in under 2 minutes (1:36 min) by Leeds University Library (YouTube)

Why use bibliometrics?

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https://rmit.pressbooks.pub/
researchwritingmodules/?p=2798#h5p-48

Bibliometrics advantages and limitations

Advantages

Simple and straightforward	Compared to altmetrics which can be difficult to collect and analyse, bibliometrics have been standardised to be quick and easy to produce.
Transparency	Results can be reproduced using the standardised methods.
Comparison	Field-normalised metrics such as the Field-Weighted Citation Impact (FWCI) used by Scopus and SciVal, or the Category Normalised Citation Impact (CNCI) used by Web of Science and InCites, can be used to measure the impact of a journal article within the research discipline.
Reliability	As a quantitative analysis tool, bibliometrics are broadly accepted as a relatively objective measure of academic impact since they demonstrate that other researchers have read and made use of your work. Additionally, the peer-reviewed scholarly environment in which they occur provides a degree of regulation.
Time span	Well established with data going back many years – for example, the Web of Science databases indexes scholarly literature from 1900.
Scalable	Bibliometrics application extends from analysis of large data sets for institutional purposes to micro-level analysis of a single researcher's output.
Interconnected	Bibiometrics work in concert. Combining an article's metrics with metric data on the author, and the journal, can give an indication of the likely quality of the article.

Limitations

Time lag	There are timeliness issues around demonstrating scholarly influence since citations take a while to accumulate. Other researchers may read the paper promptly, but it takes time for them to make use of the research, write a paper, and get the paper published.
Bias	Bibliometrics inevitably involve a bias towards older papers. Older papers tend to be more highly cited than more recent papers because they have had more time to collect citations. Because of this, there is also an inherent bias towards more established researchers. Field-normalised metrics (FWCI and CNCI) factor in the publication date when formulating the metric.
Specialisation	Bibliometrics can fail to reflect high quality work published in very specialised journals. Research that is of relevance to only one country will also not be accurately measured by the basic metrics.

Referencing patterns	Referencing patterns vary across disciplines with some fields having a higher rate of publication and citation.
	Disciplines in STEM are comprised of research groups rather than individual researchers, and the members of the group naturally reference the work of their colleagues in the group. Basic research will also have a higher rate of citation as it is referenced both within the field and by relevant applied research fields (e.g. both biochemistry and medicine).
	Other fields, such as the humanities, social sciences, art and design, have different publishing patterns and may not attract many citations. The problem is exacerbated in very specialised fields with few researchers.
Algorithm limitations	The H index, which requires high productivity in addition to impact, may not reflect the impact of seminal work by a key author who has relatively few outputs.
Publication format	Research outputs such as books, book chapters, reports and creative works are not covered well by scholarly/citation databases which have a strong focus on journal articles.
	Bibliometrics measure the impact of researchers and outputs on further research, but it is not easy to quantify the nature of that impact.
Purpose	A possible problem may include a paper receiving many citations for negative reasons, although this would be rare. More commonly, papers citing review articles and methods papers which are unlikely to be central to the exact topic under discussion.

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/ researchwritingmodules/?p=2798#h5p-50

USING BIBLIOMETRICS

Scholarly databases such as Scopus, Web of Science and Google Scholar, as well as research analytics tools such as SciVal and InCites can be usedto track bibliometrics to measure academic impact.

Photo by Ashley Batz on Unsplash

No single source covers the entirety of your research outputs, so it's advisable to use more than one when doing citation analysis.

The databases listed below can all be accessed through the RMIT University Library website. They are also linked on the Research Metrics library guide.

Bibliometrics: which database to use?

Metric name	Description	Database
Citation count	The citation count is an article-level metric that measures the number of times a publication (usually a journal article or conference paper) has been cited in later publications. There are a number of issues to consider with regard to citation counts. A high count isn't always an indicator of quality. Some publications are cited because they are examples of poor research, are controversial or are rejoinders to more prominent works. Citations may also result from an author citing their own work.	Scopus Web of Science Google Scholar
h-index	The h-index is an author-level metric designed to measure the impact and productivity of a researcher. The h-index is calculated by the number of papers from an individual's publication list to have at least the same number of citations. If a researcher has an h-index of 5 then they have at least 5 publications with 5 or more citations.	Scopus Web of Science Google Scholar
Citation report	Citation databases allow you to aggregate your output data into a citation report to demonstrate your impact within the academic literature. Statistics provided include: number of items published in each year; number of citations in each year; average citations per item; citation count per item; and, author h-index.	Scopus Web of Science

Metric name	Description	Database
Field Weighted Citation Impact (FWCI)	FWCI is a metric available in Scopus and SciVal. The FWCI is a field-normalised metric that can be applied to an individual publication or group of publications and aims to compare the citations received by a publication or group of publications with the average number of citations received by all other similar publications from the same research field. Also, the FWCI is available for article level metrics in Scopus.	SciVal
Category Normalised Citation Impact (CNCI)	CNCI is a metric available in InCites, which analyses publication and citation data from the Web of Science database. The CNCI is similar to the field-weighted citation impact, and benchmarks the impact of an article or group of articles in a particular subject area.	InCites

Scopus, Web of Science and Google Scholar

Scopus, Web of Science and Google Scholar are citation databases that enable measurement of your h-index and citation counts.

Scopus

Scopus is a comprehensive scientific, medical, technical and social science database produced by Elsevier. [Access the Scopus database](#) (login required) to find your h-index, citation counts, and some altmetrics.

- video: [Search for an author and view their profile tutorial](#)
- video: [How to assess an author's impact tutorial](#)
- guide: [Scopus quick reference guide](#)

Web of Science

The Web of Science database is a selective citation index of scholarly publishing covering the most prestigious, high impact research publications in the world. [Access the Web of Science database](#) (login required) to find your h-index and citation count.

- video: [Create citation reports in Web of Science](#)
- guide: [Web of Science training resources](#)

Google Scholar

[Google Scholar](#) comprehensively indexes publications on the

web including non-peer-review conferences and other publications. Google Scholar enables researchers to create a profile for themselves once they have publications appearing in the database. This profile allows for an author's publications to be linked to their profile and displays the author's h-index and citation counts. Access Google Scholar (login required) to search for a paper's citation count or to find an author's h-index.
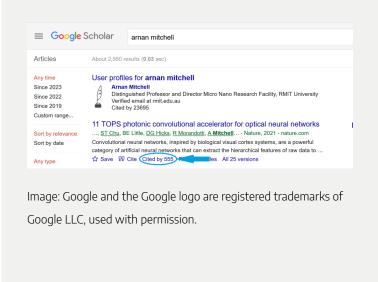
- video: Show your research impact with a Google Scholar profile
- guide: Google Scholar profiles

Activity

Google Scholar Activity

Access Google Scholar and search for one of your own papers or perhaps a colleague's or supervisor's.

Note the citation count. You can see an example of what you are looking for below.

Image: Google and the Google logo are registered trademarks of Google LLC, used with permission.

Web of Science Activity

Now search for the same paper in Web of Science (login required). Compare the Web of Science citation count to that in Google Scholar. Does Web of Science have the same or similar citation count? If different, why might that be?

SciVal and InCites

For a deeper analysis and benchmarking of measures of impact SciVal and InCites are recommended.

SciVal

SciVal is a research analytics tool that can be used to analyse publication and citation data from Scopus.

Access [SciVal](#) (login required) to discover your Field-Weighted Citation Impact (FWCI) and more.

- video: [SciVal Metrics Guidebook Webinar](#) (55:40 mins)
- guide: [Introduction to SciVal](#)
- guide: [Research Metrics Guidebook](#)

InCites

InCites is a citation-based evaluation tool that draws its data from the Web of Science database. InCites can provide an analysis of a researcher's work and benchmark output in a field. Access [InCites](#) (login required) to discover your CNCI and more.

- video: [InCites Essentials](#) (73 mins)
- guide: [InCites Benchmarking and Analytics](#)
- guide: [InCites Benchmarking & Analytics: Learn the Basics](#)

More information about benchmarking your research is provided in the next chapter.

Research evidence for grants and promotion is a library 'how to' guide on information and tools for describing and capturing evidence of research outputs.

Finally, explore potential issues around relying purely on bibliometrics by watching the following video.

'I am very troubled by the importance of impact factors' Brian Kobilka, Nobel Laureate (1:50 min)

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://rmit.pressbooks.pub/researchwritingmodules/?p=3835#oembed-1

"I am very troubled by the importance of impact factors" Brian Kobilka, Nobel Laureate (1:50 min) by NobelPrizeII (YouTube)

BENCHMARKING YOUR RESEARCH

Why benchmark

Benchmarking your research performance against other comparable individuals, institutions, and research centers, can be another method of demonstrating the impact and engagement of your research. This approach can be useful when applying for grant funding or career advancement.

Photo by Aaron Burden on Unsplash

The Library guide Research evidence for grants and promotion is a 'how to' guide on information and tools for describing and capturing evidence of research outputs.

Using proprietary tools

The two main bibliometric tools that can be used for benchmarking are **SciVal** and **InCites**. SciVal's data is sourced from Elsevier's Scopus database, whilst InCite's data is sourced from Clarivate's Web of Science database.

SciVal

Access [SciVal](#) (login required). *Note:* that an Elsevier account is required to access this resource.

Watch the following video to learn more about using SciVal to benchmark your research performance.

Benchmarking in SciVal (1:53 mins)

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/ researchwritingmodules/?p=2879#oembed-1

[Benchmarking in SciVal](#) (1:53 mins.) by Ana Ranitovic ([YouTube](#))

InCites

Access [InCites](#) (login required). *Note:* create an account using your RMIT email.

Watch the following video to learn more about using Incites to benchmark your research performance.

InCites Benchmarking & Analytics: Quick Tour (4:53 mins)

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/researchwritingmodules/?p=2879#oembed-2

[InCites Benchmarking & Analytics: Quick Tour](#) (4:53 mins) by Web of Science Training ([YouTube](#))

ABOUT ALTMETRICS

What are altmetrics?

Altmetrics, or alternative metrics, are qualitative measures that provide insights into what is being said about research in non-academic environments. Altmetrics aim to demonstratehow research is being used to create public policy and solve real-world problems.

Altmetrics demonstrate the kind of attention research has received in sources such as social media,

Photo by sanjoy saha on Unsplash

online news sources, blogs, policy papers, patentsand other non-academic sources. Altmetrics can be used to demonstrate your broader impact as a researcher and to provide evidence of social impact and engagement.

Outputs that have a persistent identifier, such as a DOI, ISBN, etc., can be tracked by altmetrics.

Altmetrics provides you with real time information on the attention being given to your research outputs.

On the other hand, bibliometrics are traditional quantitative measures of citations that take time to accrue and measure the reach of the work. Explore the 'About Bibliometrics' section of this module to learn about Bibliometrics.

Altmetrics may include information about:

- the number of article or data citations, views or downloads in an institutional / preprint repository
- who has shared your work on social media (e.g., Twitter, LinkedIn, Facebook) and the potential reach of their audience
- mentions in online news sources
- citations in patents
- mentions in blog posts from individuals and organisations
- citations in policy documents.

Watch the following video to learn more about altmetrics.

What are altmetrics? *(4 mins)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/ researchwritingmodules/?p=2802#oembed-1

What are 'altmetrics'? (4:00 min) by Altmetric.com (YouTube)

Why use altmetrics?

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://rmit.pressbooks.pub/ researchwritingmodules/?p=2802#h5p-34

Altmetrics advantages and limitations

Advantages

Speed	Altmetric scores can begin to accrue immediately as you publicise your research. This is particularly useful for those whose bibliometrics citations may not have accumulated.
Range	Altmetrics provides data on many types of outputs, not just scholarly articles, including datasets, software or code, conference presentations, book chapters and reports.
Detail	Altmetrics provides detail on who is engaging with research outputs and what they are saying and where they are saying it. Altmetrics use many indicators, not just citations, to give a full picture of research impact.
Non-academic	Altmetrics can surface non-academic discussion of your work and track the public conversation as it happens. People may mention the research but not actually cite it.
Sharing	Altmetrics encourages sharing of research outputs with the academic and broader community as researchers are keen to promote conversation about their research.

Limitations

Unregulated	Altmetrics is unregulated and may be manipulated or gamed easily.
Reliability	Public conversation measured by altmetrics is not necessarily indicative of research quality.
Difficulty	Altmetrics can be difficult to collect, for example bloggers or tweeters may not use unique identifiers for articles.
Acceptance	Altmetrics may lack broad acceptance by academic communities or funding bodies.

| Context | Use of online tools may differ by discipline, geographic region, and over time, making altmetrics difficult to interpret. |

Test your knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=2802#h5p-35

USING ALTMETRICS

Altmetric Explorerand **PlumX** are aggregator tools that can be used to navigate altmetrics.

In addition, altmetrics are available from journal websites and open access resources such as

Photo by v2osk on Unsplash

repositories. *Note:* the RMIT Research Repository draws data from Altmetric.com.

About Altmetric Explorer

Altmetric Explorer tracks where published research is mentioned online by following lists of sources, including social media, news sources, government and non-government reports, blogs, Wikipedia, policy documents etc., and text-mines them for links to research.

The research outputs that Altmetric Explorer tracks include not just scholarly publications, but also datasets, code and non-traditional research outputs (NTROs) including news

media, policy documents, posters, creative practice outputs, websites and more.

To be tracked by Altmetric Explorer you need *four* things:

1. a [research output](#)
2. that has a [unique identifier](#)
3. and is [mentioned in a source Altmetric tracks](#)
4. including a hyperlink back to the original research output

The Altmetric doughnut

The multi-coloured Altmetric doughnut represents the volume and source of online attention.

"Altmetric rgb (crop)" by Altmetric is licensed under CC BY-SA 4.0

The colours of the doughnut represent the [sources of online mentions](#). For example, blog posts are yellow, Twitter is blue

and policy documents are purple. The amount of each colour changes depending on which kinds of sources make up the mentions.

The number that appears in the middle of the doughnut is the Altmetric Attention Score, a product of the number of mentions and the quality of the mentions sources. For example, a mention in online news media scores higher than a Reddit post.

Watch this video to find out more about Altmetric Explorer.

Altmetric Explorer for Institutions Introductory Tutorial *(5:06 min)*

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://rmit.pressbooks.pub/
researchwritingmodules/?p=2804#oembed-1

Altmetric Explorer for Institutions Introductory Tutorial (5:06 min) by Altmetric YouTube Channel (YouTube)

Accessing Altmetric Explorer

Access [Altmetric Explorer](#) (login required). *Note:* create an account with your RMIT email.

Once logged in, the default page will display the full database but you can toggle and select 'edit search' to access Advanced Search and then select 'My institution only' for RMIT University research outputs only.

Search

Quick search option is available, but the Advanced search provides many options such as keyword, title of output, ORCID, DOI, and more.

After searching, results will be broken down into highlights, research outputs, timeline, demographics, mentions, and journals.

Attention breakdown includes social media, news and blogs, policy and patents, academic sources and other sources.

You can use the saved searches icon to share searches with others and email the reports to yourself.

Details page

Selecting the 'doughnut' will take you to the Altmetric details page, giving you access to the attention received by this output.

The Attention Score gives an overview of the attention that any particular output has received.

Tabs across the top will give you a feed of mentions by mention type. You can set up an alert for new mentions.

'Attention score in context' benchmarks the paper against other mentions.

Create shareable reports

You can create a report to share, either as a static PDF or as a dynamic link which is usable even by people without subscription access to Altmetric Explorer. If you share your report via a link the data is live and will update automatically to reflect changes. Instructions are available on the [Altmetrics](#) library guide.

About PlumX

PlumX is altmetrics displayed in databases such as Scopus, Science Direct and EbscoHost. PlumX offers item (article) level metrics that includes traditional citation metrics as well as metrics on the way people interact with the individual research outputs. PlumX gathers metrics from many different [online research outputs](#) that are categorised into the following five areas:

Photo by [Jelleke Vanooteghem](#) on [Unsplash](#)

Citations – contains traditional citation indexes such as Scopus, as well as citations indicating societal impact. *Examples*: citation indexes, patent citations, clinical citations, policy citations.

Usage – Signals how people may be using the research. *Examples*: clicks, downloads, views, library holdings, video plays.

Captures – This work may attract future citations. *Examples*: bookmarks, favourites, readers, watchers.

Mentions – Measurement of activities such as news articles

or blog posts, showing how people have engaged with the research. *Examples*: blog posts, comments, reviews, Wikipedia references, news media.

Social media – Social media measures the attention. It is also a good indication of how well the research has been promoted. *Examples*: shares, likes, comments, tweets.

Activity

Explore the different sources presenting altmetrics for the following article:
Ionic imbalance induced self-propulsion of liquid metals.

Where has the article been mentioned and received attention?

- Journal website
- Scopus database (login required)
- Altmetric Explorer database (login required)
- RMIT Research Repository

Tips to improve your altmetrics

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://rmit.pressbooks.pub/researchwritingmodules/?p=2804#h5p-36

EXPLORE FURTHER

Congratulations on completing this module. We have explored concepts around academic research impact, and hopefully you are now familiar with the bibliometric and altmetric

Photo by Kier... in Sight on Unsplash

measures of research impact and the tools available to gauge these measures.

Further assistance

Individual assistance – For more assistance with research metrics contact the library by submitting a Request Research Assistance form.

There are a number of useful **library guides**, including:

- Research metrics
- Altmetrics
- Research evidence for grants and promotion

Learn more

You may also be interested in viewing the following webinar Are you being cited? (55 mins) recorded from the Library's PhD Up! program (now called Research Plus). The webinar content complements this online module.

The International Association of University Libraries (IATUL) has produced a self-paced training program IATUL Research Impact Things with the aim to equip learners with the skills and knowledge required to engage in the use of a range of metrics around research impact and gain understanding of the research landscape.

The Researcher Capability Development has a suite of online modules, explore the offerings on Impact.

Feedback

Your comments and suggestions on how we can improve this module will be appreciated. Please complete our feedback form.

What's next?

You have completed this module on Are you being cited? You can return to the Research and Writing Hub to choose another module to complete.