

## INFORMATION LITERACY (LIBRARY)

Use this sheet to help you:

- Use the library effectively
- Construct a search statement for use in databases
- Develop an effective search strategy
- Create a research log

### 5 minute self test

Consider the following questions before reading the chapter.

- What is information literacy and why is it important?
- What strategies are needed in finding information in a library?
- What is a CALL number and how is it constructed?
- How do you construct a search statement?
- How are Boolean operators used to narrow and widen a search statement?
- What is a journal? How is it different from a book?

## 1. Introduction

The university library is likely to become one of your best friends during your postgraduate studies. As a postgraduate you will need your university library to find all the information you need to complete your work for assessment. Even if your lecturer provides you with reading materials, and does not require you to use the library, it is often an unstated expectation that postgraduate students will find additional sources of information on their own. This research is done using the databases and other resources available at the library.

Effective use of a library requires you to be informationally literate. This is a skill that is expected of postgraduates.

Being **informationally literate** means:

- Knowing where to **find information**
- Knowing where to **find help** if you are unsure
- Knowing how to **use information** when you get it

Note also that some information literacy skills become obsolete almost as soon as one learns them. This is due to the development of ever-changing online and computer-based systems. Therefore, these skills need **continual development** and **regular practice**. This chapter provides a starting point for learning these skills. In writing this chapter I have benefited greatly from a useful article by Keig (Keig, 1993).

## 2. Why you need the Library for your Research

There are several important reasons why you need to be informationally literate and skilled at using a library effectively.

### 1. The Information Explosion

Information is expanding rapidly. Academic papers are continually being published in all fields of knowledge throughout the world. It is not possible to keep up with one's field of expertise solely by subscribing to a few major journals. Rather, you need access to the library's ever-expanding resources, and the skill to find relevant information.

In recent times, the world has seen the rise of the internet as a research tool. While the internet is wonderful for research purposes, it is often over-utilised by students, and for the wrong reasons. Students are often unaware of how to distinguish the value of different internet resources. It is fair to say that, because of the internet, there has never been a time in human history where so much information is available. Unfortunately, however, much of the information available online is of poor or dubious quality. The ability to distinguish credible resources from less reputable resources is critical. Another problem is the sheer volume of information. This means that it is harder and harder for researchers to keep abreast of information.

## **Choosing a Topic: It's not as Easy as you Think!**

Students completing masters by coursework subjects often need to choose a topic to research. Some topics, such as The Causes of Global Warming, are not only controversial, but have information being published about them daily. These types of topics are sometimes referred to as "hot topics". While there are advantages in working in "hot" topics, the disadvantages are that there is often too much new changing information for a Masters student to be able to control.

On the other hand, if you choose a topic that is no longer being researched in academic circles, sometimes referred to as a "cold" topic, there can be too little recent published information. An example of this would be "The Threat of Communism to Capitalism". This topic is no longer considered very relevant, and so is of little interest to other academics. Choosing a "cold topic" might make researching the topic easier, but you may find it hard making your qualifications relevant to the world outside the university.

A topic somewhere between these two extremes, a "warm" topic, can be best. The library can help you here, as specialist librarians are experts in finding key sources of information for topics of current interest. Make sure you learn who these people are, and ask for their help.

## **2. Information Systems**

The library provides information systems to access what has been written in a particular field and guidance about how to use materials for your own research. Information sources may be in a variety of forms. These include indexes in paper format, online indexes, CD-Rom databases, web-based databases and catalogues (more than ever, most databases are "online"). Knowledge of information systems can help you keep abreast of new developments. Accessing recent information does two things:

- It demonstrates your wide knowledge
- It shows your research skills and information literacy

Both of these things are important for postgraduates. They are less critical for undergraduates. Lecturers are impressed by postgraduate students who can integrate recently published sources into their essays and assignments. In general, never simply rely on reading lists given to you by your lecturers. Always be on the lookout for new published material. Do this even if lecturers fail to mention this as a requirement. A postgraduate is distinguished from an undergraduate by his or her level of scholarship. **Scholarship** is the ability to find and use information from published sources in your own work.

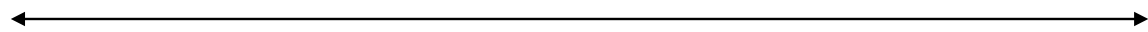
## **3. Awareness of the Points of View of Others**

You will encounter multiple points of view on a topic as you start searching the literature in the library. It is important to be aware of the different points of view that exist in your field as this knowledge helps you to develop your own point of view about a body of knowledge. This is important, because as a postgraduate, you need to advance well-argued, and well-supported opinion yourself. This can be as simple as using your own prior work experience in the context of an academic issue, or it may be more creative (i.e., venturing a view on a topic on which there are already many different opinions).

## 4. Having Control through Independent Learning

Students that can use the library to find new and interesting resources are regarded highly by their lecturers. Such students demonstrate skills in scholarship. Many students do not do this. They merely use the reading lists given to them by the lecturers. However, the best students try to educate their lecturers with new, up-to-date published sources. This involves skill in being aware of new resources and this involves being informationally literate. Lecturers know most of the reading material on a subject, however, they do not know everything. If you can mention data from an article in your work that lecturers may not have seen, this will greatly impress them.

Think about successful postgraduate learning in terms of a continuum as shown below. The more a student demonstrates independent learning as a postgraduate, the better the grades. The more the student shows originality in their thinking, the better the grades.



### **Bare Pass or fail**

- Student simply reproduces the content of lecture material
- Student does no further reading
- Student does not argue for a point of view.

### **Clear High Distinction**

- Student goes beyond the reading list
- Student educates lecturer
- Student makes a small contribution to an academic debate.

## 3. How Libraries are Organised

Libraries are no longer just places where journals and books are kept, although this is still an important function of the library. They are also places where you can access other collections of electronic books, journals, and individual articles via computer. These electronic collections are called **databases** and are like additional libraries. Your library pays expensive subscription fees to these databases so that students have a wide range of resources available for research. However, a major frustration for many students is realising that the information is at hand but not knowing how to access it. The rest of this helpsheet aims to give you a broad overview into firstly, how libraries organise their hard copies of journals and books, and then secondly, how databases function and how to use them. In practice, I find that many international postgraduate students do not know this information, or they have very limited knowledge.

Most libraries offer introductory tutorials into searching their catalogues and databases which are worth attending. Not only can you ask librarians questions, but you can often complete practical exercises in such tutorials that help you use the library. Thus, you get to practice doing searches with an expert at hand who can give you immediate help and advice if you have any difficulties.

## 1. The Dewey Decimal System

The Dewey decimal system is a system for cataloguing library holdings used around the world. Its great advantage is that it allows for endless expansion. It is composed of numbers 001-999 which stand for the following areas:

- 000 Generalities
- 100 Philosophy and Psychology
- 200 Religion
- 300 Social sciences
- 400 Language
- 500 Natural Sciences and Mathematics
- 600 Technology (Applied Sciences)
- 700 The Arts
- 800 Literature and Rhetoric
- 900 Geography and History

In each category, there are further numbers which represent the sub-areas within that general area. For example, in the 300s (social sciences), the 310s relate to statistics, the 320s relate to the political sciences, and the 330s relate to economics. These sub-areas are then divided into further categories as shown below:

- 330 Economics
- 331 Labor economics
- 332 Financial economics
- 333 Land economics
- 334 Cooperatives
- 335 Socialism and related systems
- 336 Public finance
- 337 International economics
- 338 Production
- 339 Macroeconomics and related topics

In each of these categories, there are further sub-divisions. It is useful to know the Dewey system for your academic area so that you can go directly to the area of the library that holds texts that are relevant to your subject. This saves time.

## 2. The Construction of a Call Number

Each item owned by the library, be it a book, a CD, a film or a journal, is given its own number, which is known as a CALL number or a Dewey Number. This locates that item within the Dewey system, so it is easy to find. To find the item you want, you therefore need to know the CALL number. Every part of a CALL number is important, as the different parts of the number tell us different things about the book. Sometimes CALL numbers can be long—the decimal point may be preceded by three numbers and followed by more. When you find a book on the catalogue that you want to borrow, it is important to write the entire CALL number down, as well as the letters. You then need to locate the book by going to the part of the library where those numbered books are kept. Normally, shelves have the numbers of the books contained within them clearly shown at their ends. When you find your book, check it carefully to make sure that it has the right author and is the correct edition (see below).

## CALL Numbers

The CALL number (or Dewey Number) is the best way of identifying books and journals in the library. A call number looks like this:

### 709.04 A743H 2003

This is the call number for the book: *A History of Modern Art: Painting, Sculpture, Architecture, Photography* by H. H. Arnason.

709.04 is the number for modern Fine Arts resources

"A743H" is a combination of numbers and letters for this particular book.

"A" refers to the book's author, whose surname starts with A.

The "H" is the first letter in the title of the book "History of Modern Art".

**NOTE:** "A" and "The" are always omitted when cataloguing or listing items.

2003 is the edition of the book.

This book is in its 5th edition, the first being published in 1969.

Some publisher terms may be useful here. The **edition** of a book refers to the number of times a book is published from a single printer's type-setting. An edition stays the same regardless of how many times a book may be reprinted unless the book is: 1) reset by the printer; 2) changed (in which case the book will say that it is: **revised**, or **abridged** or **enlarged**); or 3) issued by a new publisher. If a book is issued by a new publisher or an edition is reprinted then it is called a **reprint**.

If a book is only published once, there is generally no "edition" mentioned. However, if a book is changed or revised and published more than once, it is referred to by its edition number. For example, if a book is published first in 1966 and again in 1970 and again in 1999, these are the "first", "second", "third" editions of the book respectively.

It is very important to ensure you have the correct edition of a book if your lecturer has specified a specific edition, as information in later editions can vary enormously from information in earlier editions. If the edition is not included in the call number then check on the page on the **left hand side** in the first few pages of the book (known as the **verso page**) before the text starts. This is where all publishing details should appear.

Most university libraries around the world have guides for using these cataloging systems. For example, have a look at the Monash Virtual Librarian tutorial: How to decipher call numbers, <http://www.lib.monash.edu.au/vl/callno/callcon.htm>. See also the WebDewey Tutorial: <http://www.oclc.org/dewey/resources/tutorial/default.htm>. Your own university will have similar guides to help you, and don't forget to book into an introductory library tutorial if one is offered.

## **Confusion over Names**

Make sure that you are clear about the use of surnames (family names) in English. Many international students have trouble with this when they are looking for information.

Bibliographies or Reference Lists are always alphabetical by surname, so you must put the surname first. When you write literature reviews or essays, you always refer to people by their surname: "Smith argues ..."; "Jones claims ...", etc. This is always true, unless, of course, you are introducing them: "Professor John Smith, Head of the Department of Management claims that ..." (afterwards, you just say: "Smith").

Because a bibliographic file system is used to catalogue work in a library, you identify writers and their work by means of surname too (e.g., the example above is: H. H. Arnason. In this example, "Arnason" is the surname and "H." is the given name intitial. "H." is also the middle name initial).

How do you tell which is the given name and which is the surname? In normal usage, the given name is first and the surname is last (e.g., book titles, signs on doors, in introductions between people).

- John Smith
- Martin Davies
- Patti Lather

In situations where filing or cataloguing is needed (e.g., in the library or in bibliographies, telephone books or directories) the **reverse** order is used: surnames first and given names last.

- Smith, John
- Davies, Martin
- Lather, Patti

**NOTE:** If the surname is used first, there should be a **comma** between the surname name and the given name.



## 4. Journal Articles

Journal articles are an important resource for postgraduate students, especially in areas of study where things are changing rapidly. If you are an information technology student or are involved in medical research, you would not want to rely solely on books for information. Journal articles give you the latest information and help you to keep abreast of issues that a book, which takes several years to publish, cannot. There is, therefore a greater *immediacy* to a journal article. Many academic debates are conducted via articles printed in consecutive issues of journals. It is therefore important that you are able to access these resources.

### What is a Journal?

A journal looks a bit like a soft-bound book, usually with a very plain cover. Unlike a magazine or newspaper, a journal generally has no or very few advertisements. Unlike a book, a journal appears on a regular basis. The word “journal” comes from a French word *jour* that means “day” or “daily”. Curiously, very few journals come out daily, in fact only newspapers do, and they are not really regarded as a journal. Journals may appear, for example, once a month, once a quarter, or twice a year.

A journal generally has a list of all the Chief Editors, Secondary Editors and Reviewing Editors from around the world on the second page, along with information for academics about how to contribute to the journal. Good journals are very hard to publish in, and are therefore prestigious. Some of the best journals accept less than 5 percent of the articles submitted to them. Articles submitted are peer-reviewed by means of a process that can take months or even years. Unlike books, journals appear in two main forms: “issues” (which are more frequent) and “volumes” which are collections of issues bound together.

Finding a journal article can be much more difficult than finding a book. Whereas books have their own call numbers which are linked to the library catalogue, journal articles do not. Of course, journals have their own call numbers, but these can be of limited help when trying to locate one of the specific journal articles within a journal. Thus, trying to locate journal articles is normally a three step process.

- In the past, to find a journal article, you first had to search a printed list that came out annually. If you wanted to access articles from different years you had to look at different lists. The list told you the volume and issue of the journal in which to find a specific article.
- You then had to go to the library catalogue and make sure they had subscribed to the journal that year, and locate the specific volume and issue.
- Then you had to find the particular volume and issue to find the article you wanted.

These days, that process is a lot easier because of electronic databases. It is however, still normally a three-stage process. This is described below.



## 5. Electronic Databases

In many ways an electronic database is similar to a printed index for journal articles. Some electronic databases come in the form of compact disks (CD-ROMs). However, more frequently these databases are available online from the publishers. Your university buys annual subscriptions to databases that support the teaching and learning done at the university.

An electronic database differs from a library catalogue in that it lists every journal article individually, whereas the library catalogue only lists the journal titles and dates. Conveniently, many databases also contain the **full text** of the article. This means finding your article is only a one-step process, as you can save the article to disk or USB or print it out immediately. However, often databases contain only an abstract and details about the journal and the volume in which it was published. Locating the abstract is the first step. **Secondly**, you need to go to the normal library catalogue, look up the **journal title**, as opposed to the journal article, and make sure that the library has the correct volume of the journal. Then **finally**, you need to locate the hard copy on the library shelf. If your library has an electronic link to the journal you may be able to obtain the electronic link to the journal from the catalogue and download the article from there. **However, it should not be assumed that because there is no internet link to the journal, that the library does not have it.** Many students do not know that they have to carry out the third part of this process to access the journal article. Therefore, many of the resources on the database are often not utilised.

In place of this process, many students rely solely on the internet. However, it is strongly advised that postgraduate students use databases in preference to the internet. One of the first things you should do is to identify the key databases used in your specific subject area. In most universities, lists of these databases are provided by librarians on their websites or in printed form. Find this information and learn the databases. These databases will form the basis of much of the research work you do.

Your login and password are needed for accessing these databases and you may use them within the library, from the computer laboratories, from home, or from other places around campus.

### **The Internet as a Research Tool**

While the internet can be highly useful for research purposes, it needs to be used with caution. Many students seem to think that "googling" is the only way to do research. The best students, however, rarely use Google, or search engines like it, unless it is to access **Google Scholar**. <http://scholar.google.com/>. If you want to use an internet search engine for research, use a scholarly database such as Google Scholar which filters worthless information and can help you find articles from quality refereed journals. **However, don't use it instead of databases.**

The internet's main disadvantage as a research tool is that anyone can post information on it. This means that all kinds of things can be said on the internet, false or accurate, poorly argued or well argued, helpful or worthless. Therefore, if you are to use internet for research purposes, do so with great care!

## 1. Advantages and Disadvantages of Databases

Electronic databases have their advantages and disadvantages. It is good to be aware of these so you can take measures to ensure you avoid problems, and maximize benefits.

### **Advantages:**

There are certainly many advantages to be gained from using the electronic version of an index to journal articles (Keig, 1993):

- *Breadth of search:* You can access information over several years at once. (By contrast, annual printed indexes can only be used one at a time).
- *Specificity:* Very specific searches can be achieved by combining concepts. This can be done using logical connectors (see Section 8: Boolean Operators).
- *Speed:* compared with human searching techniques, the computer is very fast indeed.
- *Access and convenience:* Articles can be downloaded (increasingly, the full text of an article) on your topic. This is very convenient.

### **Disadvantages:**

- *Not Backdated:* The information revolution is young. Typically, only information from recent years (often around the last 10 years) is contained in electronic abstracts. You'll need to use the printed version to pick up references to your topic that might be prior to this. Of course, just because an article is recent does not mean it is a good and just because an article is "old", and not given in an electronic database, does not mean it is "not good". For many students in disciplines such as Fine Arts, History of Economics, or Law, the more informative and useful articles may only be available in paper-based indexing formats. This applies to some other subjects as well. If you only use an electronic database you may miss them completely.
- *Incomplete Access:* Electronic indexes do not always contain the full texts of articles. Sometimes you will then need to find hard copies of the actual articles in the library's collections.
- *Misleading Information:* You can't always get what you see in an electronic database. The Library may not hold all the journal articles that are indexed by the electronic databases. This can be frustrating.
- *Variability in operation:* Different command structures are used in different databases—no uniform method of searching exists that applies to all databases. (However, library staff often produce helpful database guides to help you understand these commands.)
- *Fosters Laziness:* Full-text databases can make students lazy. That is, students often do not find extremely useful papers for their work simply because they do not use anything that cannot be immediately printed from the database. By contrast, a good postgraduate scholar will find and use excellent resources regardless of whether they are printed-based or paper-based.

It would be wrong to assume that a search using an electronic database could yield all the references you might need for a topic. In fact, you may miss a very valuable article which is unavailable in electronic form. It might be an article in paper form that is just a few minutes' walk from where you are using the electronic database! Therefore always check **printed indexes** as well as electronic databases to make sure you have not missed anything potentially useful.

## 2. Choosing the Right Database

There are specific databases for different academic discipline areas. It is important to choose the right one to use. Your Subject Librarian can give you information about which databases can be used for the subjects you are studying. The following are examples: *EconLit*, *Expanded Academic ASAP* and, especially, *Proquest* (e.g., *ABI/Inform*) are some of the best databases for Economics and Commerce students. *AUSLIT* is a database used for articles on Australian literature. *PSYCINFO* is used for psychology. *MLA* is a useful database if you are studying literature. *MEDLINE* is the key database used for medical topics. *APAIS* (Australian Public Affairs Information Service) is used for information about Australia. You should certainly familiarise yourself with the databases available in your discipline before you begin your studies. The *Expanded Academic* database covers relatively broad topics, such as politics. It is impossible in a helpsheet like this to list them all. (Adapted from (Keig, 1993). This information changes regularly as well as new databases become available.

## 6. Some Basic Search Techniques

There are two types of searches that you will have to do as a student. The first involves finding a book or journal article of which you already have the name and author. Typically, this text will be specified on a reading list given by your lecturer or tutor. The second type of search is for information on a topic. The second search is by its very nature much more complicated and requires good information literacy skills.

### 1. Finding a Book or Journal Article

In the first search, you generally not only have information about the author and title, but also the edition and publisher if it is a book, and the name of the journal article as well as the volume, journal title, year, and the pages on which to find the article if it is a journal article. In this case, you can go straight to the library catalogue and insert the author's family name into one of the fields, and key words from the book or journal title into the other. You can see this below with the book we used in our call number example.

**A History of Modern Art: Painting, Sculpture, Architecture, Photography** by H. H. Arnason  
Search the catalogue

The screenshot shows a library search interface with two search rows. The first row has a dropdown menu set to 'local', a text input field containing 'Arnason', a dropdown menu set to 'all of these', and a dropdown menu set to 'in: Author'. The second row has a dropdown menu set to 'modern art history scul', a dropdown menu set to 'all of these', a dropdown menu set to 'in: Title', a text input field containing '20', and a text input field containing '1'. Below the search rows is a 'Search' button.

This will lead you to a list of entries with details about the author, title, publishing date, edition, publisher and call number. Once you have selected the specific book you are looking for from the list, the catalogue gives you additional information about the book. Its status—that is if it is available, not for loan or already out on loan—will be given, as well as information about the library collections where you can find the book (if the library has more than one collection of books).

If it is a specific journal article you are looking for, and you have the title of the journal it is to be found in, as well as the volume/issue number, you would place the **title of the journal**, (in this case, *Nature*) not the title of the article in an advanced search of the library catalogue. An example would be if you were searching for:

Wu, C. (2007) 'Space Exploration: Secrets of the Martian Soil', *Nature*, Vol. 448, pp. 742-745

## Advanced Search of Catalogue

Search for	Nature	Limit to	No limits
Search in	Title (first words) Title (any phrase) <b>Journal title</b> Keyword (relevance) Keyword (boolean) Author Browse authors Browse subjects Browse call numbers		

This would then direct you to either hard copies within the libraries, or link us across to databases that the library subscribes to with electronic downloadable versions of the journal. You would then need to locate the appropriate volume (and issue, if appropriate) and then find the article on the pages mentioned.

## 2. Finding Information on a Topic

A search for information on a topic is more complex. It starts with you **deciding on a topic** and **defining** it. A strategy for this is discussed below.

## 7. Hints for doing a Search on a Topic (1)

Electronic catalogues and databases allow you to combine concepts so that your topic is defined very clearly and exactly. However, to use them properly, you need to construct a precise search statement. You cannot use ordinary English. Rather, your search statement has to be able to instruct the computer in a language it understands. This unique language allows the computer to locate specific articles. To develop a successful research statement, consider this four step approach below.

### 1. Define Your Topic

Write down the topic that you want to investigate in one precise sentence, for example: *"Deforestation in Indonesia and the comparative roles of deliberately lit bushfires and logging operations"*. You need to be very specific or your search will be fruitless. If your topic is more general than this, try to **narrow it down**. The narrower and more focussed the topic, the easier it is to find information. Your final grades will be better with a narrowly-focused assignment too, as you can write in more depth. And of course, depth is always better than **breadth** in postgraduate study.

### 2. Identify Concepts

Identify the key concepts from your topic by underlining them. In the above example, the key words are: "Deforestation", "Indonesia", "Bushfires", "Logging".

### 3. Think of Synonyms

Write down all the different words that mean the same thing for each of the key concepts. They need not be **exact synonyms**. Synonymous terms for the above words include the following: "land clearing", "forest fires", "timber felling", "South-East Asia".

Broad terms such as "South-East Asia" are important because while there might not be an article about Indonesia, there may be articles on other countries in the region, which mention Indonesia. The key to good searching is to be as narrow as possible while also allowing for broader terms if the narrow terms are too detailed. In this way, you can find useful articles even if they not directly related to your topic.

Be aware of colloquialisms. While "bushfires" may be a common term for a forest fire in Australia, most databases and catalogue systems use keywords/subjects that are based on American English. This means that they will not have anything stored under the word "bushfire", but they will have lots of resources stored under "forest fires". Likewise, somebody studying underground trains in England will need to use the American term "subway trains", instead of "underground trains" or "metro trains" in the database. Luckily, most catalogues allow you to look at a detailed record of any book you find, and this normally lists the keywords/subjects/descriptors/topic area it has been catalogued under. Thus, the subjects under which the book: *Indonesia's Fires and Haze: The Cost of Catastrophe*, included "Asia south-eastern", "forest fires", "environmental", "deforestation" and "Indonesia". Thus, in my next search, I would know to use the term "Asia south-eastern", instead of "South-East Asia", as I would know the catalogue only stored articles under the keywords "Asia south-eastern".

To become good at doing this, you need to practise working with catalogues and databases over many months. Moreover, you need to **regularly visit** the library to learn about the new tools and techniques available. Information literacy resources change and improve regularly. A weekly visit to the library and an occasional meeting with a subject librarian is very valuable for professional researchers and for serious postgraduate students.

### 4. Truncation

Truncation involves the shortening of terms with symbols. Special symbols (typically ? or \$ or \*) are used in databases to search for more words than you have typed in. This "wild card" (allowing for many different forms of the same term) occurs after the stem of a word. Using the wild card, all words beginning with that stem will be retrieved. It is particularly good if you want to look up the singular and plural form of a word, e.g., woman and women(s) would be found using "wom\*".

However, you need to be careful using truncation symbols. "Mono\*" will find too many words (monounsaturated, monotheistic, monolingual, etc.) that are probably irrelevant to your research. Similarly, if you want to obtain articles which have slight variations in terminology then a truncation may not work. For example, "parasite\*" will help you get articles that use the plural form "parasites", but it will not enable you to obtain articles which use the word "parasitical". There may be an excellent article which uses the word "parasitical" in the title that you do not retrieve. This would be unfortunate. Considerable care and practice is therefore needed (Keig, 1993).



## Hints for doing a Search

**Synonyms:** Use a dictionary and/or a thesaurus to help you to think of alternative words for each of the key concepts.

**Thesaurus:** Some databases have a built-in thesaurus that you can use to identify useful search words while you are using the computer; some have a printed thesaurus that you can consult before you start searching.

**Terminology:** As already noted, bear in mind that different countries use different terminology—“petrol” in Australia is “gasoline” in the United States.

**Spelling:** Remember that there are alternative ways of spelling words like “behaviour”, “programme”, “organisation”, “offence”, “theatre” and so on. Check the dictionary!

**Plurals:** You will usually need to include both the singular and plural forms of words—“company” as well as “companies”, “flower” as well as “flowers”; “woman” as well as “women”. This is important to note unless truncation or “wild cards” are allowed. (These allow you to shorten the word to capture different variants in word endings.) Each database has different rules for truncation and you need to learn them.

From Keig (1993)

You are now ready to do a topic search, but before you can proceed you need to understand how Boolean Operators work.

## 8. Boolean Operators

Boolean operators are logical connectors that combine the keywords that you identify in the planning stage of your search.

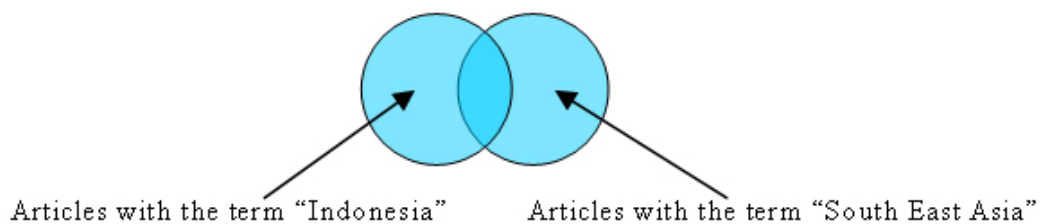
NOTE: I see many student put articles, prepositions and adjectives into search engines. This will not lead to useful information. Nouns and noun phrases joined by Boolean operators “and”, “or” and “not” are the only terms you should use.

The two most common Boolean operators are given below. Try to forget the usual meanings of the words in everyday language: we’re using them here in a special way, as precisely defined logical connectors.

## 1. The Boolean operator "OR"

The OR operator combines equivalent words. These words should mean the same thing—synonyms and variant spellings, for example. When you use the OR operator, you effectively make the basis of your search broader.

For example, if one of your key concepts is "Indonesia", you should have written down "South East Asia" as conceptually related words. To make sure you find all the relevant articles in a database you need to include both words in your search. This diagram shows what happens when you use the Boolean operator "OR":



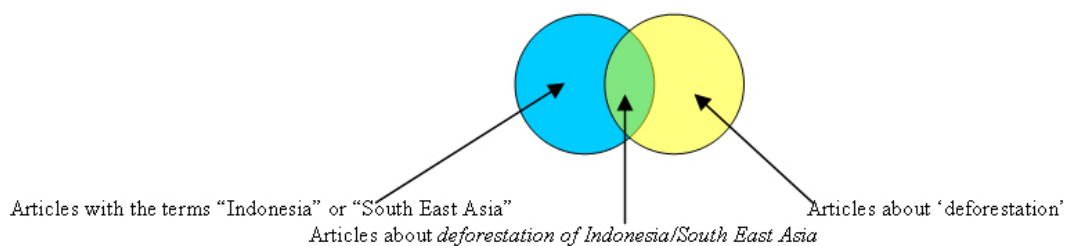
If you type in the search statement "Indonesia OR South East Asia" the database will retrieve all the articles that contain the word "Indonesia", as well as all the articles that contain the word "South East Asia". It also retrieves articles those that contain **both** words.

The "OR" operator

- adds terms
- broadens your search

## 2. The Boolean operator "AND"

The AND operator works by combining different concepts and telling the computer to only find articles that always have both concepts.



The "AND" operator:

- combines terms
- narrows your search

The combination of concepts connected by Boolean operators is called a **search statement**. A search statement (not a sentence or phrase) is what you need to type into the computer to tell it to find articles on a topic.



The search statement to find articles on **solar eclipses** would be constructed as follows:

(SOLAR **OR** SUN) AND (ECLIPSE **OR** ECLIPSES)

**NOTE:** You must enclose terms linked by OR in **parentheses** (like this), so that they are processed first. You can make use of **truncation** in the above search statement—instead of (eclipse OR eclipses) you could type:

(SOLAR **OR** SUN) **AND** ECLIPSE\*

The computer then retrieves all the articles that mention either “sun” or “solar”. It puts them to one side. Then it retrieves all articles with the word “eclipse” or “eclipses”. It puts them to one side as well. Finally, it does an instantaneous comparison of the results of both searches and retains only those articles that contain both concepts.

The final step in the search process is to display the results of your search. This enables you to look at the full citation (author, title, name of journal, date, page numbers) of each of the journal articles to decide whether they are relevant to your scholarly purposes (Keig, 1993).

## 9. Complex Searches

It is possible to construct quite complex searches to define your topic exactly. These can be done using the same basic techniques. The topic: “Deforestation in Indonesia and the comparative roles of deliberately lit bushfires and logging operations” could produce the following search statement:

(deforestation **OR** land clearing **OR** burning off) **AND** (bushfire\***OR** forest fire\*) **AND** (logging **OR** timber felling **OR** clear felling) **AND** (Indonesia **OR** South East Asia **OR** Asia).

This is obviously very different from a normal English sentence! But it is what a computer understands.

Remember that once the database gives you a list of journal articles on your topic, you will have to note the journal titles and volume/issue numbers they are to be found in, unless you are fortunate enough that they link to full-texts of the articles. You then need to do a second search of your library catalogue to see if the library subscribes to a hard copy or online version of the journal.

## Activity: Developing a Search Statement

Try the following procedure when searching for academic material in your library:

- Narrow down your general topic area
- Identify your key terms
- Think of relevant synonyms for each key term (as many as you can)
- Develop a search statement for your research area
- Use Boolean logic to test your search statement in a database
- If you can't find anything, refine your search statement and use different synonyms

Try specifying "Refereed or "Peer-Reviewed"\* in the database, if available, to limit the search to academic articles. A peer-reviewed article has been read and assessed by experts in the field before being published. If you find this limits the results too much, uncheck the option and try again.

Make sure you specify "Full Text" to ensure that you can access the entire article. **CAUTION:** This may exclude some of the database and therefore exclude many useful articles. If you can't find enough articles, deselect "Full Text". You will then need to find the paper version of the journal in the library. If you find too many articles, narrow your search statement to retrieve fewer items. You will usually want to find a maximum of around 50 items. Search through these one by one and find the best articles. Be quite choosy as not everything that is published is worthwhile. Only select the most interesting, relevant or accessible articles for your research.

\*To get a better understanding of how to choose quality articles, read through the Monash Virtual Librarian tutorial How to identify academic resources, <http://www.lib.monash.edu.au/vl/scholar/scholcon.htm>.

## 10. Hints for doing a Search (2)

Information searches need to be strategic and there are several steps you should follow (Adapted from (Keig, 1993).

### 1. Analyse the Problem

You first need decide on the amount of information you need. How general or specific do you need to be? What questions are you hoping to answer? Will a general article from a textbook on the topic be sufficient, or do you need a more refined and dedicated source?

### 2. Identify Keywords

As we noted before, make a list of possible alternative words (nouns and noun phrases) that describe your topic. You could use a thesaurus, dictionaries, books, or journal articles you already have on the topic to help you. Different information sources/ locations and databases may use different ways of expressing the same key word.

### 3. Create a Search Strategy

How many years of literature do you want to search? How much information do you want? You need to be selective as there is so much information out there.

## 4. Identify Appropriate Information Sources

Check your local equivalent of the Library Subject resources pages (for example: <http://dozer.infodiv.unimelb.edu.au/SuRe/subject.php>). These will provide lists of suggested databases for your subject. Ask the librarians at the information desk, who may direct you to your subject librarian. If it is books you want, the first step is the library's catalogue.

## 5. Translate the Strategy to Fit the Tool

Every tool (book, catalogue or database), has its own vocabulary, and its own means of access. The wordlist that you created may have to be used differently for each database in order to retrieve information.

## 6. Retrieving Information

Determine which information is useful and which is not. Is it current? Is the author well known in your field? Is the article published in a well-known and reputable journal? Is the subject matter covered from the point of view that you require? You should be critical of information. There is such a large amount of it, and not all of it is good.

As you search you will refine and change parts of your search strategy. If you document the development of your search strategy, you will not repeat work you have already done. (See **section 12. Keeping a Research Log.**)

## 11. Citations

When you find a book in the catalogue (or anywhere) that you may use for your research work, it is important that you write down all the relevant information to identify the book. This is called the **reference**. A book reference includes: the author's name, title of book, publication date, place of publisher, name of publisher, and sometimes, additional information.

### Example of a Book Reference:

Author	Title	Publication details
Besanko, David A. Braeutigam, Ronald R.	<i>Microeconomics: An Integrated Approach</i>	New York: Wiley, 2002

A journal article reference includes, title of article, journal name, inclusive page numbers (from start or article to end of article).

### Example of a Journal Article reference:

Author	Title	Publication details
Johnston, C.	Student Perception of Learning in First Year in an Economics and Commerce Faculty	<i>Higher Education Research and Development</i> , Vol. 20 (2), 2001, pp. 169-184.

The order in which you arrange these is dependent on the **referencing style**. When you list the works that you have consulted in writing an essay or thesis, you have to use a standardized format or referencing style. This allows someone else to find the work from the details you have given. A referencing style is like the road rules. We all follow the same rules so that we know what each other is doing (and to avoid accidents and mistakes). It's the same with referencing. Following a referencing style allows fellow scholars to read and follow each other's work accurately; it allows us track down each other's information.

## 12. Keeping a Research Log

Students should keep careful records of their information searching activities. Without a search diary you will be certain to waste time looking for articles that you found before. A search diary helps students to be systematic in their approach to searching for literature. To be useful, such research logs might include:

- names of databases searched
- the search string you used
- the years searched for using each database

See the sample library research log below.

<b>Example of a Research Log</b>			
<b>Tool searched</b>	<b>Search String</b>	<b>Years</b>	<b>Citations</b>
EconLit CSA	Reserve Bank and interest rates	1986-2003	24
EconLit CSA	Reserve Bank and interest rates and exchange rates	1995-1999	2
ProQuest	Reserve Bank and interest rates	all years	2631
ProQuest	Reserve Bank and interest rates and exchange rates	2003-1973	192
ProQuest	Reserve Bank and interest rates and exchange rates	2002-2003	4

**Extract from a library research log**

In the above example, the student has searched the EconLit database to find documents with the word 'Reserve Bank and interest rates'. This search string was then narrowed by adding a new term to the search. Another database ProQuest was then tried, using the original terms, and the search had to be narrowed again by means of selecting dates. The research log can be as long and detailed as required.

A research log enables you to check your research path over several days or weeks of researching the same topic. It is useful to avoid getting lost in the literature and to ensure your research is directed and purposeful. For PhD students working on the same topic for several years a research log is critical. Having a clearly recorded and documented path enables you to avoid wasting time back-tracking. This ensures efficiency in research and saves a lot of time.

Of course, the log needs to take the form that will be of most use to the student. It could, for example, be either electronic or paper-based. And it could have other important information (for example, the number of full-text citations available, or those papers that are peer-reviewed). It could also include lists of important journals and their call numbers in the most frequented libraries, lists of important authors, and lists of important keywords and thesaurus terms. Researchers should record their plans for literature searching, as well as record what they actually do with the references. Such a log is therefore also invaluable for diagnostic purposes. In her book *Supervising Postgraduates*, Ingrid Moses suggests that the log may also document material actually read by the student (as opposed to just collected but not read).

For higher degree students, the research log can sometimes be requested by lecturers who wish to know the direction their research is taking. It is therefore a good habit to get into for a number of reasons.

## 13. Summary

In this helpsheet, I have covered the basics of information literacy, the Dewey decimal system, citations, search statements using Boolean operators, and clear research strategies. I have also covered the topic of research logs. Information literacy is critical for postgraduate students, and the more informationally literate they are, the faster they will be able to find useful information. However, these skills need to be practised and updated frequently. Getting help from information literacy experts is essential.

## References

- Keig, A. (1993) *Some Basic Search Techniques*. University of Adelaide News, 15.  
Moses, I., (1985) *Supervising Postgraduates*. HERSDA University of NSW.