

Reading Scientific Literature

Work with scientific literature in internal assessments and extended essays

Based on material from Flinders University, GPO Box 2100, Adelaide. SA

<http://www.flinders.edu.au/current-students/slc/>

Why Read?

The essence of all scientific research is to generate new knowledge, i.e. to discover more about people, literature, music, economics, psychology, physics, chemistry etc. Most scientific research studies are reported in the "scientific literature", in most cases in the form of a journal article.

The scientific literature comes in many forms e.g.

- Text books, reference books, handbooks of data.
- Review articles and monographs of similar work done in a particular area of study.
- Journal articles in current literature.
- Scientific abstracts and citations - a summary of current and historical information.

One of the most important skills you need to develop as a student is reading and understanding what you read. This includes

- reading about subjects which may not be familiar
- learning technical and scientific jargon
- translating academic language into normal English for essays and papers
- making meaning out of tables, graphs and other diagrams
- sorting out the things which are most relevant
- following and understanding the meaning of a complex argument
- dealing with contradictory information or views.

Many of these problems can be overcome or at least addressed by the use of an appropriate strategy, with time and with the development of your own reading

skills.

One of the assumptions many students make is that the writer, being an expert in his/her field, must always be correct. This of course is by no means always the case. As a reader, you must learn to appraise objectively the work of others, i.e. using critical thinking skills.

Here are some strategies which may help you get the most from the time and effort which you spend on your reading. These are not designed to be recipes for success, but more a starting point around which you can build your own methodologies.

Know your purpose

In scientific reading there will be several purposes for reading. A good reader will adapt their style accordingly.

- To locate some specific information in the text you might skim read (ie pass your eye quickly over the text picking up only enough to recognise what the text is about) until you see a relevant piece of information
- To inform yourself generally, say before a lecture, you might read steadily without noting
- To gather material for an assignment you might read sections very carefully making notes about material you can use
- To understand an experiment you might read the methods and jot down diagrams to help you understand before you read the results.

Reading essential texts

In some courses there are set text books and you will be expected to read from these.

- Scan the **contents** page before you begin reading. It will give you an overview of what the book covers and what the authors thought was important.
- Go to the **Index** at the back. Pick out the key words or names you need to follow up.
- Read the **first and last paragraphs** of chapters. These will often provide a concise statement of the authors' intentions and major points.
- Skim through each relevant chapter or section.
- Read the relevant sections of the whole work carefully, section by section, noting major points or ideas **in your own words** and recording which sections are of particular interest so that you can find them again later.
- Look at the information about the authors of the text and the date when the book was first published. This may help you to understand the

authors' point of view and where their work fits in with other publications in the same field.

Reading Journal Articles

The reading of current literature in the form of journal articles is often the most daunting task for undergraduate students. The material is often written by experts in the particular field and most often for other experts in that field. Do not let this put you off.

Reading should be in two stages. Try to discover the "meaning" of the article before you start reading more closely to extract information.

- Look at the title: it should describe the study briefly.
- Read the abstract. The abstract is a concise summary of the article. It should contain

- the aim of for the study

- the method used

- the results

- an interpretation of the results

Look for these elements as you read the abstract.

- Read the summary/conclusions. If the abstract indicates the article may be useful, look for a section titled "summary/conclusions" and read it. If this section does not exist, skim read the discussion. As you read ask yourself how this information can be used for your own purpose (ie Where does it fit into my assignment? How does it relate to the lab report I am preparing?).

Having got a broad understanding of the article you are now in a position to read it more closely if it useful to you. In order to help you make meaning of the details it is again recommended that you attempt to answer a series of questions such as these

- What is the overall aim or desired outcome of the study? How is the study relevant to the specific issues addressed and also the broader issues?
- What specific scientific problem is being addressed?
- What methods have been used to investigate the problem?
 - What is the rationale behind the methods employed?
 - What specific methods were used? What are the limitations of

the method? Was there an adequate sample size? Was there a sample control?

- What were the results of the study? Are all the results presented or only a representative sample? Look carefully at all the tables and graphs and form your own opinion as to what they mean.
- Are statistics presented? If so, are the statistical interpretations accurate and based on the results?

- The discussion section should give an interpretation of the results. Are these interpretations warranted based only on the results presented? Are there any assumptions that have been made? What conclusions has the author drawn from the results and their interpretation?
- Do the results and their interpretation and conclusions answer the overall aim of the study?
- Has the study contributed to an increase in the understanding of the area of study? What further studies should be performed? How may the results of the study be used in other related fields of study?

You may not initially be able to answer all these questions. You may need to read the article several times. If you are stuck on particular aspects of the study, the data or other things that you find difficult to understand, then **ask someone for help**.

Some students keep a log book of articles they read. They note full bibliographic information then they attempt to summarise the article, with the use of diagrams, using the above questions on one A4 page if possible. This is a good idea when you write extended essay.

Finally, the more you read, the more acquainted you will become with the language, style and terminology of the scientific material. With time your reading speed, comprehension and critical appraisal of the contents will improve. You will never have time to read everything so you need to make a decision as to what **you** think is the most important. You must be in control.

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Study Skills - Reading Scientific Literature

Welcome - General information

