

Guidelines for Organising and Referencing a Scientific Report

Philip Anderton

January 2002

This is a brief summary of the principles you need to consider when writing and presenting a scientific report as part of your undergraduate studies in optometry. The nature (length, format, content) of your submission will vary from course to course, however there are some important principles related to scientific integrity and presentation which must be common to all your reports. This is a brief discourse on those principles.

Fundamentals

Science is about the discovery and publication of new knowledge. It is surprising how many students come to gain a scientific training at University while being completely unaware of the nature of scientific endeavour and the accepted scales of measurement of scientific productivity and achievement. A scientist is successful when, through study of a problem and original research, they are able to have an account of their work published in a respected and peer-reviewed scientific journal.

When you write a report, you must respect the same principles of presentation and integrity in your publications as are expected of professional scientists. This means that you must:

- Present a cogent and intelligent argument
- Be concise and accurate
- Discriminate between your own work and that from other sources, and provide appropriate acknowledgement
- Provide appropriate references to significant statements of fact or principle

Most undergraduate reports will contain little or no original research data. The real original contribution in a student report is to organise and present information gleaned from the literature in an original and hopefully insightful way. This is just as valuable a contribution as doing the original experiments, and in many ways more difficult. Nevertheless, this is what is expected, and a quality result will only come with study and analysis of the literature, and a concerted effort in writing your report.

The literature

The body of scientific journals provides the most original source of up-to-date scientific information. Text-books are generally not used as references because they are often directed at a relatively naïve audience and for a particular academic purpose (to support a course in Anatomy, for example). Moreover, by definition the information in a textbook is generally out-of-date.

Scientific journals publish significant recent original research and are generally oriented towards a particular scientific discipline, though they may also be generalist. Some examples include our own "Clinical and Experimental Optometry" (CEO), a scientific journal in the discipline of optometry which you can see and download on-line at the Optometrists Association Australia website: <http://www.optometrists.asn.au/ceo/ceo.html>. A more general journal is "Nature" which can be found at <http://www.nature.com/nature/>. Unfortunately it is not free!

References

Using the CEO website, download a paper from the most recent issue (available as an Adobe Acrobat '.pdf' file), and look at the list of references at the end of the paper. Chances are they will look something like this:

1. Takehisa Y, Yokoi N, Komuro A, Kinoshita S. Association of precorneal and preconjunctival tear film. *Adv Exp Med Biol* 1998; 438: 407-410.
2. N'Dow J, Robson CN, Matthews JN, Neal DE, Pearson JP. Reducing mucus production after urinary reconstruction: a prospective randomized trial. *J Urol* 2001; 165: 1433-1440.

These entries refer to individual articles in other journals which the author has chosen to use to refer to specific facts or statements in the text. If you look at different journals you will find a number of different styles. There is no “right” or “wrong” way to list references.

Go back to the issue of CEO on the web. Select an ORIGINAL PAPER with more than 5 references. Find the article in the bibliography with the number “5” before it. Then look back through the main text of the paper till you find some text with a small superscript “5” next to it. This is where you will find the statement which the author says is supported by this article. This is called a *citation*.

In your presentations you must use the same technique. Important and significant statements must be accompanied by specific references in your bibliography, and you must include a specific cross-reference to the listed article in the text. It is NOT sufficient just to provide a list of references without providing the citations in the text

Peer-review and Citations

The tough thing about scientific publications is that they are peer-reviewed. This means that articles submitted by one scientist are sent out by the Editor of the Journal to another scientist of equal or greater stature in the field for comment and review. The reputations of both scientists are at stake here. The original author wants to have her paper published because this is good for her career and she is proud of its originality and brilliant content. The reviewing author needs to show the journal editor that they have a solid grasp of the paper and can offer an intelligent and serious critique of the article. Often the article will be rejected on the basis of some perceived inadequacy, or at least will need to be re-written and re-presented for publication.

The same rigour does not apply to web pages. Anyone with a web-server can write and publish a web page without having its content peer-reviewed. **So if you want to use a web page as a reference you must present evidence that it has been peer-reviewed.** Often this simply means checking that the author has made substantial contributions to the scientific literature in the same area – however in this case you might be better referring to those instead of the web page.

Headings and general organization

Do not submit a report which is an amorphous mass of verbosity. Before beginning to write, draw up a skeleton plan of the document. Use headings to differentiate between different parts of the report.

Most articles will have an Introduction and a Discussion or Conclusion section. Use the Introduction to set the stage for your presentation. For example if you are writing a critique of a specific paper, you might lead the author into the area addressed by the paper. Why is this area important? How does it relate to other areas and to the practice of clinical optometry?

The content of the middle section of your article will reflect its intent. Only papers reporting original results will have a “Methods” and “Results” section. Otherwise, devise heading to reflect the main thrusts of argument you develop in the paper. If it is a review, try to create broad headings to reflect the broad structure of the divisions of information in your review. In the Introduction, tell the reader how you are going to structure the paper, and why.

In the Conclusion, summarise the main points which you feel are important insights gained from your report. In the case of a review, you select some areas which might be particularly important for clinical insights, for example. Alternatively, show the reader how the information you have summarised has implications in other areas of science. High marks come from being creative with your analysis of the information you have found.

Common mistakes in student reports, and their remedies

1.Failure to cite references in the bibliography.

It is not sufficient just to give a long list of references at the end of your report, without showing, through cross-referenced citations, how you used those references. An easy way to do this is to use the “Cross-reference” facility in Word-processors to insert citation numbers in the text. For MS Word see the help files on “Create a cross-reference”. This enables you to

keep a modifiable list of references with appropriate cross-referenced citation numbers in the text. These numbers can be updated as the number of positions of the references change.

3. Citation of Web Page URLs

If you **MUST** use a web page as a reference, then you need to provide evidence that it has been peer-reviewed. If it has not been peer-reviewed then it is unsuitable as a source from the scientific literature.

4. Inappropriate format for papers and books

You can select any appropriate journal format for listing references. Note that references to chapters in books are different from Journal article references. Choose a format which you like and stick to it throughout the report.

5. Inadequate acknowledgement of other sources

Dishonest presentation of other's work as your own is a serious breach of the University principle of academic integrity. This includes the use of ghost writers, text from web pages, and copying text from previous reports. The University will discipline such dishonesty severely and promptly. Do not be tempted to present falsely authored work as your own.

Philip Anderton
School of Optometry, UNSW

Comments please to P.Anderton@unsw.edu.au