GUIDE TO ACADEMIC WRITING

University of the Western Cape

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Introduction

Compiling a Guide to Academic Writing is a tricky thing to do – there is no standard format of academic writing that can be applied to all topics across all disciplines. What counts as acceptable academic writing in your subject is rooted in the kinds of practices and conventions that have developed in your discipline area over time. So what is regarded as a suitable format of academic writing in History may not be the same as that in Botany.

Nevertheless, there are some general considerations that you may apply to your specific academic writing task. This Guide hopes to give you some generic insight into what the general demands of academic writing are. But what distinguishes "academic" writing from other kinds of writing? When is a text regarded as "academic" and when not? The point of academic writing is to *clarify* something so that you, and members of the academic community, develop a *better understanding* of it. Maybe the following image may help: think of writing your thesis or assignment as a similar task to developing an understanding of a particular tree. Now, in order to understand the tree, you'll first need to be able to identify it as a tree, and not as, for example, a shrub. So you need to have an understanding of the concept / classification of a tree. Then you need to give a very accurate description of it – its shape, structure, texture, colour, describe the leaves, bark, fruit, etc. You want your reader to construct a vivid and accurate image of the tree you are describing. But this is not enough for understanding the tree. You will also have to go below the surface and inspect its roots – what underlying factors influence the tree's growth? How has it developed from a seedling into a tree? How has it grown over the years? In other words, you also need to start to explain why the tree looks and grows like it does. But this is still not enough for a full understanding of the tree. You will also need to consider the tree's environment – the weather conditions, the nutrition levels of the soil, the animals living in the tree, etc. These all affect the tree's growth and appearance and the tree, in turn, affects the environment in which it is.

So, in short, what makes writing "academic' is that it:
- Demonstrates understanding
- Is informed by the academic literature and debates in the subject matter (the literature will inform your interpretation of the concept, your perception, your description, the explanations, as well as the broader context.)
- Has a clear interpretation of the key concepts used
- Gives an accurate description of the issue
- Investigates the underlying assumptions and the historical development of the issue
- Explains the issue by tracing the reciprocal relationship between the issue and its broader context.

Part 1 of the Guide is a general orientation to help you plan and structure your writing. But the writing needs to be "academic" and Part 2 takes you through the stages of developing critical reading and writing skills. Because academic writing must be informed by the literature, Part 3 focuses on the Literature Review. The Natural Sciences often have specific requirements for scientific writing that are highlighted in Part 4. Given that academic writing draws on the ideas of others, you must know how to reference correctly and avoid plagiarism. Part 5 addresses this.

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Part 1 – Writing a Thesis

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The Writing Process

Writing a thesis is not a straightforward matter, but there are certain general steps you can follow to help you in the writing process. Whether you are writing a thesis in the Natural or Social Sciences, the Humanities or any other broad discipline, you must be able to communicate your findings clearly and systematically.

The writing process is divided into three phases:
- Pre-writing phase- (planning)
- Writing phase
- Post-writing phase (editing)

The writing process is cyclical. In other words, different parts of the process happen more than once. You will therefore write several drafts before the thesis is ready for examination submission.

It is advisable to consult with your supervisor and visit UWC's Writing Centre if you need assistance with your writing. A postgraduate consultant will work together with you and your supervisor from the initial phases of your writing (pre-writing phase) to the post-writing phase.

However, before you start planning, you need to have a clear idea about what it is you want to write on. In academic writing, we tend to rely on ideas based on written up research. By consulting a number of primary and secondary sources, you'll start to get an idea of what you might be interested in researching. It is important not to ignore the value of our initial thoughts since they often provide the basis for your interests in a particular area. Don't forget to start writing, or rather, jotting down these thoughts as soon as possible so that they can be referred to at a later stage. It is frustrating to try to recall these initial, and often rather innovative, thoughts if they're not written down. Remember, you don't necessarily have to know and understand everything before you start writing. Through the act of writing you learn and are therefore able to generate and further clarify your ideas.

A. The Pre-writing Phase – Planning your writing

The first phase involves planning your written piece, e.g. your thesis, scientific journal article etc. But, why do you need to plan? Planning achieves the following:
- It gives your paper shape.
- You will not dry up halfway.
- You will not forget interesting ideas that sprung to mind.
- You are less likely to repeat yourself.
- Your paper will have a logical order.

Planning Hints:

1. **Prepare paper / thesis well before the due date (time management). The preparation time varies depending on:**
   - the length of the paper
   - workload
   - priorities

2. **Develop a (working) title**

At postgraduate level you are most likely to have an interest in the field that you wish to research (topic). Together with the assistance of your supervisor(s) you will create a title for your thesis. When formulating a title, you need to:

- Ensure that the title is succinctly formulated, captures the main focus, contains no ambiguities and grabs the reader's interest.

3. **Use prior knowledge to generate ideas**
This simply means that you should explore what you already know about the topic. Additional knowledge can also be acquired from various sources, i.e. books, journal articles etc. There are two methods of exploring prior knowledge within your field to assist in generating ideas: brainstorming and free-writing.

- *Brainstorming*
This is a process of generating ideas by listing key words or concepts without attempting to organise or structure them in a logical order (yet!).
*Example***:**
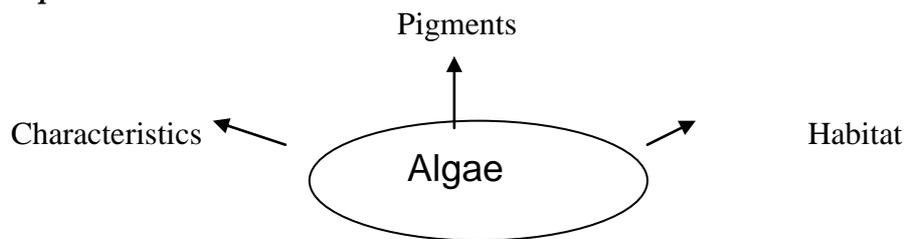
- *Free-writing*
The main purpose is to generate ideas also referred to as 'automatic writing' with no logic. The method:
  - Write as quickly as possible without stopping for 5-7 minutes.
  - If you do not know what to write, write 'I don't know what to write' or 'and…and…' until a new thought strikes you.
  - Do not worry about grammar, punctuation and spelling at this stage.

4. **Search for information**
- Use the library and databases for sources.
- Use journals and papers from conference proceedings
- Use reading techniques:
  - skimming (learning about a text before you read)
  - scanning (searching a text for specific information)
- Always photocopy and keep a detailed record of your sources.

5. **Mind mapping**
The purpose of a mind map (also referred to as outlining) is to identify the main discussion areas and the supporting detail of those discussions. It is used when planning or organising information related to a particular topic. It is a diagram showing a central or main idea/theme with branches presenting various ideas relating to the main theme.
Example:
•**Abstract**
Key words and phrases
•**Introduction**
Keywords and phrases = main ideas for the paragraphs
•**Materials and Methods**
Keywords and phrases = main ideas for the paragraphs
and Illustrations.

6. **Planning the framework**

- *Develop a storyline* to direct the reader along a clear path. This means making sure that there is a broad outline which usually moves from the general to the specific details of your argument in a clear logical progression.

- *Outline the case/s on which the thesis is built* i.e. the building blocks :
  - general research area
  - how the research problem or focus was identified and refined
  - methodology employed
  - emerging data
  - analysis of the data
  - solutions; conclusions; outcomes of the work
  - applicability in terms of recommendations, limitations and scope for further work

- *Developing the content of a chapter*, consider:
  - Purpose
  - Links with other knowledge (earlier and later chapters; works of other people)
  - Constraints
  - Work carried out
  - Outcomes of that work
  - Where next

- *Sequencing the content of a chapter,* remember:
  - the internal logic should be stated explicitly to guide readers
  - the different argument streams need to be linked by careful structuring and cross referencing

- *Linking the contents* through effective introductory and concluding sections.

B. The Writing Phase

The pre-writing or planning phase is followed by the writing phase which is also the referred to as the 'drafting' of your paper. To start with, there are some general writing rules in order to make your thesis more readable. The first rule is to proof read everything before you hand it in to your supervisor. Nothing detracts more from a piece of writing than errors! Sloppy work suggests a sloppy mind. Do your own proof reading or ask a friend to help you. Secondly, keep it simple. In other words, focus on getting your point across, writing clearly and to the point. Thirdly, leave yourself time between drafts so that you can mull over what you are trying to say. Also errors will be easier to detect after a couple of days. Remember not to procrastinate - *don't put off until tomorrow what you can do today.* Lastly, present your drafts in as neat a form as possible. In today's world you need to be computer literate, so make sure your font and spacing is consistent, use the spell and grammar checker, etc.

The drafting phase
The first attempt at drawing your thoughts together in a coherent piece of writing is usually more content based where you focus on *what* you want to say before considering the finer details of *how* it should be said. This is often regarded as the very important first step of "writerly based writing" rather than "readerly based writing". The emphasis is on whether *you* understand what you are writing about. At this point you often realize the gaps in your own understanding. When you find it extremely difficult to express a concept in writing, it is usually a signal that you haven't effectively understood the particular concept or idea. On the other hand, you may understand the logical connections implicit in the writing – it may make perfect sense to you - but remember, your writing must make sense to the intended audience (readers) as well.

The revising phase

This is the point at which you need to approach your writing as "a reader". You need to revise the first draft in terms of the way in which the information is communicated. Consider whether:

- the structural conventions for the particular section have been applied;
- the argument flows logically;
- the linking devices are appropriately used, effective and clear;
- all the points made are relevant and contribute to the argument put forward;
- any unnecessary repetition occurs;
- the necessary cross referencing has been effectively indicated.

Once you have attempted to approach the draft revision from the perspective of a reader, it is also valuable to request an outsider's perspective (e.g. a trained writing consultant) to indicate whether there are any gaps in understanding the argument presented. These gaps may occur simply because the linking devices were not as effective or perhaps misleading/ ambiguous.

A fundamental outcome of your research is its actual communication, hence you want to *teach* your reader something (Gopen & Swan, 1990). One of the most important rules of writing is to think about your readers' needs. In order to do this, consider the following:

- Is the information in a logical order?
- Are the sentences understandable?
- Are the paragraphs well organised?
- Are the ideas, results and analyses described fully enough?
- Is there any needless detail?

But who *is* your reader? At first, your reader will probably be only your supervisor, who knows a lot about the topic you are writing on. However, later on you will have other readers who may not know as much about what you are trying to say. You need to write for every potential reader, keeping it simple for the general reader, yet technical enough for the scientific fraternity.

Next you need to understand how a reader actually reads. As you read, you interpret at the same time, based on clues you receive from the structure of the prose. Just as readers expect to find recognisable sections in a thesis, and are easily confused when the sections themselves are confused, they also expect structure in smaller units of discourse. Readers expect sentences and paragraphs to contain certain information in certain places. For example, each paragraph should contain a clear topic sentence that captures the general point that the paragraph makes, and the remaining sentences should be logically connected to the topic sentence, therefore maintaining a logical flow of ideas. If the readers' structural expectations are not met, they waste time trying to unravel the structure of the prose instead of understanding its content. This is compounded when the context becomes complex, which increases the chance that the readers will misinterpret the prose.

Units of discourse – sentences, paragraphs, chapters

Units of discourse should provide linkage and context. In other words, they should define the relationship between past information and upcoming information and look forward to establish the relevance of upcoming information. This information prepares the reader for upcoming material by linking it to previous discussions. If the topic position is constantly occupied by material that fails to establish linkage and context, the reader has difficulty making the connections. Linking your sections enables the reader to follow the logical flow of the argument easily, and to focus her attention onto one strand of the discussion (Gopen & Swan, 1990).

Sentences

We will focus on the sentence first as a unit of discourse. The very *structure* of the sentence helps to

persuade the reader of the relative *value* of the sentence's contents. Avoid sentences that are too lengthy – they are more likely to cause confusion. Check that your sentences are complete at all times. Remember:

- a sentence should express one complete thought
- a sentence must make sense and be complete
- a sentence must contain a subject group and a verb group
- punctuation in a sentence contributes to the meaning intended

Some basic rules to bear in mind when constructing a sentence:

Subject-verb separation

Keep the grammatical subject and its verb as close as possible to each other. Remember, the "subject" is the person or thing the sentence is about. The "verb" is the word that indicates action; the rest of the sentence depends on the verb. For example:

Mary played
Mary played the piano
Mary played the piano very well

Word order

Changing the word order often changes the meaning. The grammatical order in which words appear has a direct effect on readability. For example:

Child eats tiger
Tiger eats child

The rule to follow is **SVO,** which stands for Subject, Verb, Object. Remember, the "object" is the person or thing affected by the action described in the verb. For example:

The snake swallowed the mouse
subject   verb   object

The mouse was swallowed by the snake
object   verb   subject

In the second sentence, the reader has to unravel the backward construction, which takes a little longer to understand than the first sentence. This is compounded as the sentence gets more complex. The second example is in the "passive voice" and is generally avoided in academic writing.

Length of Discourse

When learning to write, keep the length of sentences to below 30 words or so. As you get better, so the length of the sentence can increase. Generally, paragraphs should be at least 3 sentences long. Divide paragraphs between ideas. Each paragraph should focus on one idea, so there is no set limit to the length of a paragraph. However, for visual "breathing" spaces, don't make your paragraphs too long.

Stress Position

Readers naturally emphasise material that comes either at the beginning or at the end of a sentence. This is referred to as the *stress position*. Put important, emphasis-worthy information at the beginning or end of the sentence, when the reader is naturally exerting the greatest reading emphasis.

Topic Position

The topic position is usually located at the beginning of the sentence, where the reader expects perspective and context. The reader expects a unit of discourse to be a story about whoever shows up first; it provides them with focus. For example:

Bees disperse pollen

Pollen is dispersed by bees

These sentences contain the same information, but one tells about bees and the other about pollen.

Paragraphs

The same rules apply to paragraphs and chapters - in fact any unit of discourse. All paragraphs have the same building blocks, i.e. the core idea or topic of a paragraph should be stated in one sentence, called the topic sentence, which is located in the topic position – often first. The rest of the paragraph consists of sentences that support, develop or explain the main topic. They should be logically linked to the preceding and following sentences. Lastly, the concluding sentence is usually a summary of the argument of the paragraph, and should look ahead to the next paragraph. For a paragraph to be coherent, most of the sentence subjects should be the same, the ideas should have a clear and logical relation to each other and information should flow from old ideas to new ideas. It helps if every now and then you orientate your reader. You do this by means of signposting:

Signposts (conjuncts)
These help show the connection (relation) between one idea, sentence, or paragraph and another. They help the reader by telling her which way the argument is going:
- To show contrast: - use "however"; "on the other hand", etc.
- To show continuation / similarity: - use "in addition", "furthermore", etc.
- To signal effect / conclusion: - use "consequently", "as a result", "therefore", etc

Chapters

Similarly, chapters should also have structure. There should be an introductory paragraph, which outlines the main sections of the chapter, followed by a body of text/series of paragraphs which provide support for the argument, finishing with a conclusion which reviews the main arguments presented in the chapter. Interspersed in the chapter will be bridging (backward and forward-looking) paragraphs which help the reader (and writer!) to follow the main points of the argument.

The introduction should make clear how the chapter fits into the rest of the thesis:
The introduction:
- Orientates your reader to the development of your argument
- Sets the scene of the chapter – the general area(s) that the chapter considers, the main question it addresses
- Identifies the gap in knowledge or understanding that the chapter addresses – usually identified as an issue in earlier chapters
- Indicates how the chapter fills the gap, or responds to the chapter's posed main question
- Gives a brief overview of what is in the chapter
- Contains a clear thesis statement that reflects the essence (or gist) of the chapter
- Offers intellectual stimulation to your reader.

Conclusions
The conclusion of the chapter should remind readers of the key conclusions drawn, outcomes and how its theme will be dealt with or carried on elsewhere in the thesis. It should not merely restate the introduction or list the aspects covered, but should show growth and reflection in terms of:
- what the chapter has done – the main response to the question the chapter addresses
- what new questions the chapter has identified.
- where these questions are dealt with.

Prose style

Plain and clear language
The point of research is to illuminate and clarify, not to obscure and muddle. So, use language that is clear, straightforward. Avoid a flowery style, obscure words, buzz words and long complex sentences.

Tenses
Most of your empirical research will be written in the past tense since you are reporting on the data collecting process you have already undertaken and the findings that resulted from this. Some sections, like the Review of Literature, will be written in the present tense since you are discussing what others are thinking, and the Discussion will be a combination of past and present.

First person authorship
The trend in academic writing is to use the "first" person as the author of the text, e.g. "I will discuss …" etc. However, check with your Department first whether this is acceptable in your discipline. Some disciplines still insist on the use of the "third person" (e.g. "the researcher found that …"). Check with your supervisor.

Gender pronouns
In order to avoid clumsy constructions when the gender is not clear, (e.g. "A personal trainer would advise his or her clients on…"), scientific writers use plural constructions (e.g. "Personal trainers advise their clients on…"). Use gender-neutral constructions like "speaker", "police officer", "representative" instead of "spokesman" or "policeman".

Active and passive voice
Use of "voice" shows whether the subject acts or is acted upon. When the subject of the sentence performs the action expressed by the verb, the voice is said to be "active". When the subject undergoes the action of the verb, the voice is "passive". A simple example of the active voice is "we carried it" which, when written passively, becomes "it was carried". Writing in the active voice is more interesting for a reader, and is increasingly the preferred style in academic writing because the agent in the active voice is clearly identified (e.g. "Smith found that aflatoxins infected the blood") rather than obscuring the agent (e.g. "It was found that the blood was infected by aflatoxins").

Clear referents (determiners)
With words such as "it", "we", "this", "them" it is important that you have indicated very clearly who at what is being referred to. Look out especially for the use of "it" when the previous sentence doesn't make clear what "it" stands for, e.g. "The response indicated a link with previous research. It is an issue that needs further research?" What does "it" refer to: The "response"? The "link"? "Previous research"?

Also, ensure that danglers (dangling participles ending in " …ing") match with the subject that follows immediately after the comma. E.g. "Drawing the sample for the case study, time constraints limited the size." Who drew the sample?, the time constraints? No, *you* did. So re-write to read "Drawing the sample, I had to limit the size because of time constraints."

See also Section C in the Thesis Guide

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3.   Post-Writing Phase

The post-writing phase is all about editing your work and checking the finer details before submitting the final version.

Edited version

Check your writing for grammatical correctness and adherence to academic conventions. Academic conventions involve the appropriate use of discourse vocabulary (subject–specific jargon), formal style (less personal) and formal register (avoid shortened forms). Grammatical clarity more often involves appropriate sentence structure and punctuation. Remember that appropriate grammar usage effectively contributes to the intended meaning. Therefore if you are considering employing the services of a professional proofreader, be sure to reconsider the effect of any changes suggested.

The Final Version

Here you need to focus on the presentation of the written piece in terms of the layout (consistent headings, fonts, spacing; numbering etc) and technical academic conventions (e.g. correct referencing methods etc.)

Editing Checklist:

1. Structure and organization:	
Abstract	
Concise	
Outlines the problem and your responses	
Paragraphs	
Each deals with one aspect, clearly stated in a topic sentence	
All sentences within each paragraph are related	
Paragraphs in each section of my article are linked, in a logical order	
2. Argument:	
All aspects are covered	
Each aspect is adequately discussed	
Definitions are provided (where required)	
Argument is developed logically	
Argument is convincing	
Generalizations are supported with specific examples / evidence	
Argument draws on a number of sources	
3. Plagiarism, direct quotations, references:	
Quotations	
Set out correctly, according to the accepted convention	
Used for specific purpose (functional)	
All direct quotations, maps, tables, diagrams are acknowledged	
References	
All facts, theories and opinions that are not my own are properly acknowledged	
There is a clear distinction between references and my own statements / interpretations	
All references in the text are correct and included in the list at the back	
4. Style	
Logical outline of headings and subheadings	

The article / thesis flows (reads easily)	
The style is concise	
The language is clear	
Appropriate use of abbreviations and acronyms	
5. Spelling and grammar	
Correct spelling (use spell check)	
Consistent use of capitalization	
Correct grammar, punctuation, and tense use	
6. Presentation and layout	
Consistent numbering and layout of headings and subheadings	
Standard size paper (A4) with 1,5 spacing and printed single sided	
Pages are numbered	
Accurate typing	
Proofread by a proficient language person	
All relevant sections included (e.g. title page, abstract, references, appendices, etc)	
Keep an electronic file and hard copy of the paper / chapter for yourself.	

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PART 2 - CRITICAL READING, THINKING AND WRITING
Nelleke Bak

How often have you come across the following instruction: "Critically discuss...."? It is a phrase used often, but not always with a clear understanding of what it means to discuss something critically. I once asked my colleagues who had set exam questions starting with "Critically discuss …." what exactly they were expecting the students to do. After some initial vague responses like "Well, you know, *critically* discuss", I pushed them to spell out exactly what they thought this entailed. The responses were widely varied. Each colleague had a specific idea of what they thought it meant: "Well, obviously, students have to say why they agree or disagree with the author"; "Students must analyse the structure of the argument, assess its the validity and determine the truth of the claims"; "I expect students to highlight the underlying assumptions the author makes"; "Of course, it means they have to contextualise the author's claim"; "I want my students to develop the author's main idea further by examining the possible implications of the claim"; "What I am looking for is whether students have analysed the meanings of the concepts used by the author"; "Obviously it means that students must assess the contribution to author makes to the existing understanding of the topic", and more! Now, each one of these is a pretty sophisticated academic skill. Are you expected to do all these? What does your lecturer or supervisor expect you to do? What is the accepted academic expectation of what critical discussion entails? The following notes are guidelines to help you find some structure to developing a critical discussion.

More often than not, our initial response to the instruction "Critically discuss …" is to think that we must find fault, or highlight the weakness in the argument, or reject certain claims. Although this might at times be part of a critical discussion, it is by no means the *only* or even *most appropriate* way to engage with the claims expressed. So, before looking at what critical discussion (or engagement) is, let's get clarity about what it is not:
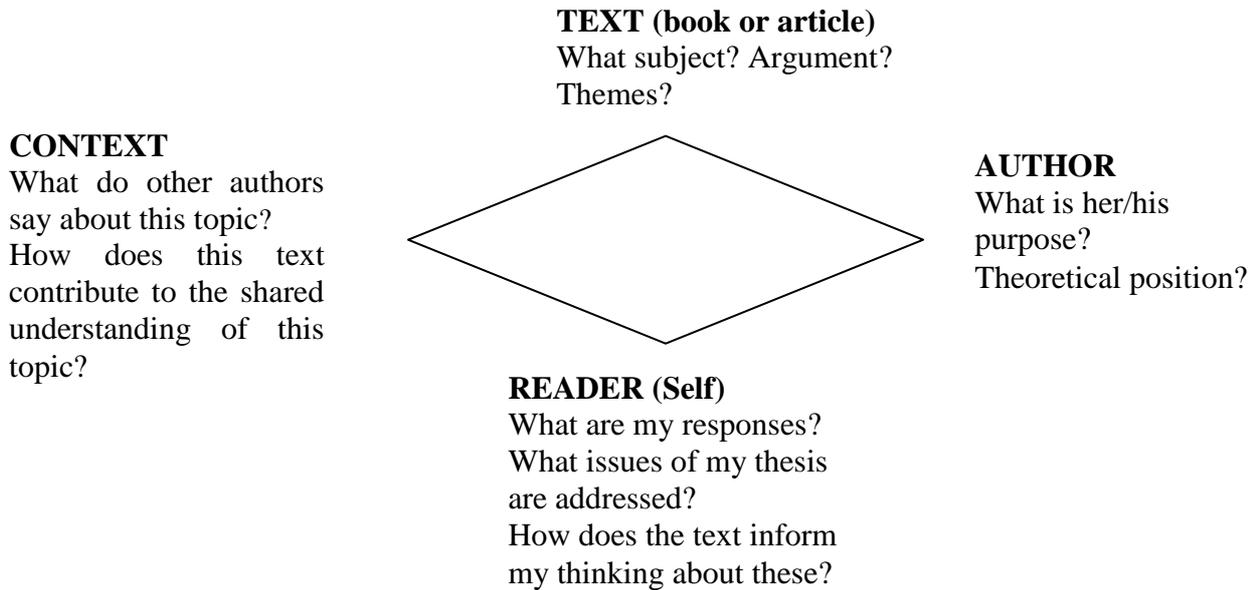
What critical engagement is not

- it is not the same as disagreement
- it does not aim to embarrass, humiliate or seek to dominate
- it does not mean nitpicking

So, what does it mean to read, or think or write critically? The following are some pointers to help you both in your reading of others' texts as well as in constructing your own writing for assignments and your thesis.

What critical engagement is

- it entails giving a *clear exposition* of the argument;
- it entails determining and assessing the *support* for a certain claim you or others have made in order to get a clearer understanding of an issue;
- it entails determining the *truth* of the premises, and the *validity* of the argument;
- it entails clarifying and analyzing the *language* used;
- it entails showing how the article or book fits into the academic debates and *current literature* – to what or whom is the text responding?
- it entails discussing the theoretical and social *context* in which the ideas are developed;
- it involves a discussion of the possible *implications* the ideas or claims could have;
- it demands *informed thinking* and *creativity*.

One way of illustrating it graphically is:

TEXT (book or article)
What subject? Argument?
Themes?

CONTEXT
What do other authors say about this topic?
How does this text contribute to the shared understanding of this topic?

AUTHOR
What is her/his purpose?
Theoretical position?

READER (Self)
What are my responses?
What issues of my thesis are addressed?
How does the text inform my thinking about these?

I've noted that critical engagement (which incorporates critical reading, thinking and writing) is *not* merely rejecting or finding fault with someone's argument or position. Rather**, it is *a rational reflection on one's own and other's ideas in order to get a clearer understanding of an issue***. One of the main things to remember when engaged in critical reasoning is that you must first have a clear understanding of *what* the author is saying *before* you can critically engage with the ideas expressed.

When engaging critically with a text, follow these 4 steps:
Clear exposition of text
1. Describe (i.e. give a clear exposition or summary of) what the author is saying and doing; You do this by pre-reading, reading, re-reading, making notes and summarizing them.
Critical evaluation of text
2. Analyze and interpret what the author is saying and doing;
3. Evaluate the author's claims, argument and approach;
4. Relate these to other literature or scholarship on the topic (or to your own thesis theme).

You cannot reject, accept, modify, adapt, disagree or agree with something if you don't fully understand what it is you're rejecting, accepting, modifying, adapting, disagreeing or agreeing with. Therefore, you must first give an exposition of the text, before stating your own responses.

How to I start to engage critically?

The four steps sound all rather grand, but how do you actually do so? Where do you begin? In order to do the 4 steps, here are a few guidelines. The following are some points that may help you develop systematically the task of first clarifying the author's ideas and then developing your own critical engagement with these ideas.

1. Pre-read
One way of getting a quick idea of what the main thrust of the text is that you are going to engage with, is to do some pre-reading before starting on the actual text:
- read the fly-leaf of the book (what is the main idea the author is developing?, who is the author?, where is s/he located?, when was the text written?),

- read the preface or introduction of the book (often in an edited collection, there is a short analysis of the various chapters);
- read the abstract (journal articles have a summary of the article at the beginning)
- check the reference list (are current, important works listed?)

2.   Read and Re-read the text

Don't expect that you will grasp the ideas in the text on one reading only, this usually involves a number of re-reads.

- Do you understand the literal meanings of the words used? Keep a dictionary at hand and look up key words whose meanings you're not sure of.
- What metaphorical meanings (i.e. meanings through association) does the author develop?
- Are there cultural terms of idiomatic expressions you're not familiar with? A good dictionary will spell these out.

3.   Make systematic notes

One of the ways to find out what you are thinking about what the author is saying, is to write down your thoughts. It is extremely important to work toward seeing a clear and accurate picture of the text. One approach to accurate seeing is to try and suspend your judgment for a while, focusing instead on describing or outlining a text. A student once described this as "listening to the author's voice" rather than to her own. Remember, the first step in critical engagement is to give a clear exposition or summary of the author's findings or argument.

- In order to help you analyse the content and argument of the text, read each section or paragraph carefully and then do two things: note its main point or idea and its function in the text – or putting it more simply, write down, in one sentence, what each section *says* and what it *does*.

Here is an example:

The text:

The case for brands

Imagine a world without brands. It existed once, and still exists, more or less, in the world's poorest places. No raucous advertising, no ugly billboards, no McDonald's. Yet, given a chance and a bit of money, people flee this Eden. They seek out Budweiser instead of their local tipple, ditch nameless shirts for Gap, prefer Marlboros to home-grown smokes. What should one conclude? That people are pawns in the hands of giant companies with huge advertising budgets and global reach? Or that brands bring something that people think is better than they had before?

The pawn theory is argued, forcefully if not always coherently, by Naomi Klein, author of "No Logo", a book that has become a bible of the anti-globalisation movement. Her thesis is that brands have come to represent a "fascist state where we all salute the logo and have little opportunity for criticism because our newspapers, television stations, Internet servers, streets and retail spaces are all controlled by multinational corporate interests." The ubiquity and power of brand advertising curtails choice, she claims; produced cheaply in third-world sweatshops, branded goods displace local alternatives and force a grey cultural homogeneity on the world. …

Yet this is a wholly misleading account of the nature of brands. They began as a form not of exploitation, but of consumer protection. In pre-industrial days, people knew exactly what went into their meat pies and which butchers were trustworthy; once they moved to cities, they no longer did. A brand provided a guarantee of reliability and quality. Its owner had a powerful incentive to ensure that each pie was as good as the previous one, because that would persuade people to come back for more. Just as distance created a need for brands in the 19th century, so in the age of globalisation and the Internet it reinforces their value. (Extract from *The Economist*, September 8th 2001, p9)

Make 2 columns:

Paragraph	What the author says	What the author does
1	Does brand advertising make pawns of people or does it bring something better?	Raises the contested issue by setting up the two sides.
2	Klein argues that brand advertising curtails choice.	Summarizes Klein's pawn theory as one response to the issue.
3	Brands protected consumers and offers reliability and quality.	Raises an alternative to Klein's theory and substantiates with historical contextualisation.

4.   Examine, categorise and summarise your notes

Once you have done this, read through your notes and then write down your responses to the following questions. This will help you develop a clear exposition of the text, in other words, to help you describe what the author is saying. Your exposition should be a clear and honest reflection of the author's text.

Give an exposition of the text
1.   What is the **topic** that the author addresses? What is s/he specifically focusing on? What are the boundaries of the topic?
2.   What is said? What is the main idea that is developed? The **main claims**? What is the author's main position with regards to the topic? Where does s/he stand? (See the "tree" structure to help you determine the author's main idea.)
3.   What is the **structure** of the text? What comes first, second, third? How does the author bind them together?
4.   What **interpretations** are offered of the main concepts? What does the author mean by "x"?
5.   How are these main ideas or the position supported? **Support** or **evidence** can be offered in various forms:
   o references to other authors
   o examples, case studies
   o metaphors - using an image to illustrate a point
   o reasons and development of argument
   o conceptual analysis
   o cause and effect
   o statistics
   o literature review
   o historical contextualisation
6.   In which **paradigm** is the author located? Through which conceptual lenses is the author looking at the issue? (Remember, there is no such thing as a "neutral" view.)
7.   What **methodology** is the author using in order to make sense of the issue or to develop a particular position?
8.   In what **context** is the author writing? Place? Date? In what discipline? In response to what or whom?

5.   Evaluate The Text – the main idea, the structure of the argument, the author's purpose, the context, the contribution to scholarship

By now have a clear grasp of what the author is saying. This is a necessary *first* step in reading critically, but it's not enough. Now you need to assess what the author is saying. Remember, critical engagement does not necessarily mean that you have to find fault, rather it means that you discuss the author's contribution to the on-going academic conversation about the issue addressed. In order to get a grasp of this, develop a response to some (or all) of the following questions:
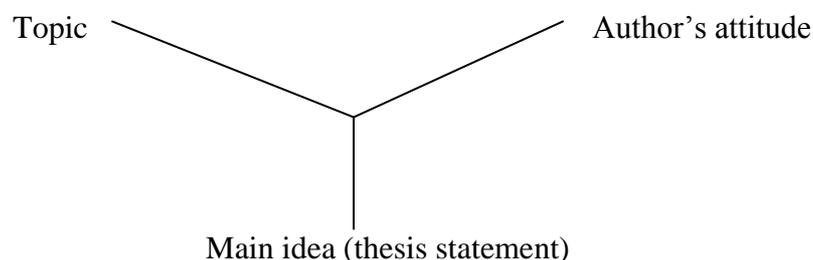
Critical engagement with the text
1.   Are the **limits of the topic** appropriate? What is not said? Why not? Is this a serious

omission? Are the limits of the topic too narrow, too broad? If the limits are too broad is the author in danger of generalizing too much? If the limits are too narrow, is the author saying anything of interest?

2.   Are the interpretations of the main concepts offered clear? Does the author rely on "buzz words" on popular rhetoric, or are the **meanings of the key concepts clearly stated**? Words or concepts are not "discovered", they are constructed for particular purposes. What are these purposes? Language embodies the perspective from which we view a particular issue. It reveals how we order our experiences, what assumptions we make, and reflects what we think.   (Since ideas are expressed in language, the analysis of language is extremely important in our critical engagement with these ideas.)

3.   Are **supports for the main claims**:
- appropriate to the context? (Does the author, for example, use findings from other fields or disciplines and transport them into another context? If so, are these illuminating or distorting? In what way?)
- true? (Is there counter evidence that might contradict these supports? Or are there other findings that substantiate the author's supports?)
- valid? (Does the author systematically develop the position or are there logical jumps?)

4.   What could be possible **counter-examples**? What other perspectives or conclusions are possible?

5.   Does the author make certain **assumptions**? (For example, does the author assume a high literacy rate among the population, a certain level of economic welfare, certain divisions in society? Are these justified assumptions? Of course, no author can spell out all the assumptions on which the ideas s/he develops are based, but you as a critical engager need to be able to judge whether there are assumptions that ought to have been spelt out but aren't)

6.   Is the **methodology** used appropriate? Does it reflect the research practices of the discipline? Could the author have followed another methodology? What does the author's methodology (or the other one) bring to light which the other approach doesn't? Is the sample size appropriate? Are the criteria for choosing the sample appropriate for the main idea the author develops?

7.   How would the issue have been interpreted in another paradigm? (Think of the duck/ rabbit example which illustrates that the same drawing can be interpreted in two quite different ways.) Language not only reflects what we think, but it also influences thinking and shapes our perspectives. We see with concepts, rather than with our eyes.

8.   The ideas are expressed in a particular context (date, setting, discipline, in response to a particular issue). How can these be **extended** into perhaps another context? (Can the ideas expressed by for example an American author be used fruitfully in a South African context? What are the particular dynamics of SA that will have an impact on these ideas? In other words, what are the **possible implications** of these ideas in a South African context? Also, can ideas expressed by, for example, a political scientist be used in an educational setting? Are there specific dynamics in an educational context which will impact on these ideas? In other words, what would be the implications of these ideas in, for example, a school setting?)

9.   What experiences of the **author** might have influenced her/his writing? What else has the author written? How does this link with the author's previous writing?

10.   What are the **connections** between this text and other texts written on this topic? What contribution does this text make to the shared understanding of the subject? What is the scholarly or social significance of this text? Texts are part of an on-going academic conversation. It is important that you have some idea of where in the academic conversation this text can be placed.

11.   Is there anything of relevance missing from the book? Certain kinds of evidence, or methods of analysis/development? A particular theoretical approach? The experiences of certain groups?

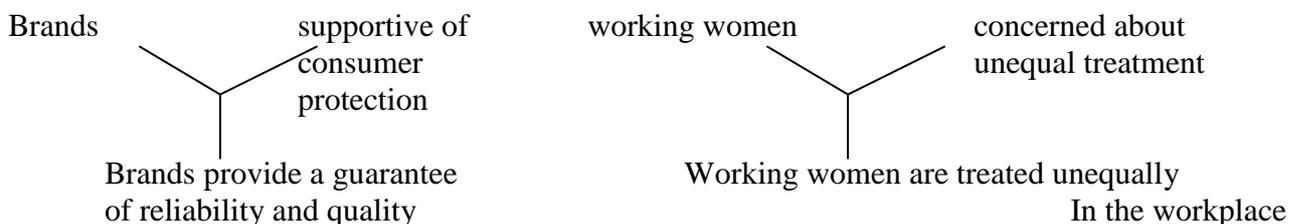12.   You have selected this particular text (or topic) because it has "spoken" to you. Why? In

what way? What questions would you ask this author if you could?
13.   How does this text inform your own thinking about the topic you are writing on?
14.   What, for you, were the three or more best things about the text? The three or more worst things? Why?

A technique for determining the author's main idea: a tree structure

It is often quite tricky to articulate in a short, clear sentence what the main idea or claim or finding is that the author is advancing, either in the overall text or in a paragraph. Since the whole purpose of a text is to compel the reader to accept a particular position, the main idea (or thesis statement) is really around which everything centres. Without such a centre, a piece of writing would be a muddle and "pointless". It would merely be a collection of incoherent sentences and paragraphs. So, if you're seriously interested in engaging critically with a text, you must first determine its main point or thesis. This is crucial because everything written by the author can be assessed only in terms of the contribution made to the main point. It is often difficult to determine the thesis, not all author state it clearly. But, *every academic text deals with some topic and its author always has an attitude toward that topic.* To determine the topic go back your notes on the paragraphs, and try and determine a common concern of the paragraphs. Also, consult the abstract, title or summary of the text – very often the author will state the main claim there.

Topic / Author's attitude — Main idea (thesis statement)

For example:

Brands / supportive of consumer protection — Brands provide a guarantee of reliability and quality

working women / concerned about unequal treatment — Working women are treated unequally In the workplace

Blocks to critical engagement

One can be hindered in the critical engagement with an issue because of certain bad habits. Be aware of these not only in the author's writing, but also in your own responses to the author.

- **cultural conditioning**: often signaled by words such as: "obviously", "of course", "must",. Ask, what are the "givens" or taken-for-granted assumptions the author makes?
- **reliance on opinion**: this means to accept blindly on the basis of popular opinion. E.g. "It is said that....", "Everybody knows that....", "It is a well-known fact that....." (Says who?)
- **hasty moral judgment**: to take for granted that something is a good thing. Often signalled by "ought", "should" or "must".

- us-them thinking or either-or thinking: this makes us believe that there are only two (usually opposing) positions; one is good/true, the other bad/wrong. It often sets up false polarities and ignores other possibilities. (E.g. "Capitalism vs socialism", learner-centred vs teacher-centred", "progressive vs conservative", "left" vs "right")
- **use of labels and appeal to "buzz" words**: often encourages simplistic thinking. E.g. "democratic" , "empowerment", "community". We need to look closely at the assumptions that underlie these labels and the rationale that drives them. (I once taught a course in which I had a long list of "banned words" on the wall – if students wanted to talk about these, they had to use *different* words to try and express the same idea. They struggled at first, but quickly realized how it forced them to think much more deeply about the issue.)
- **resistance to change**: it can be threatening to let go of preconceived and cherished notions, of set ways of doing things and thinking about them.
- **slanting:** there is nothing wrong with using expressive and emotive language, but this *in itself* cannot be a substitute for argument. Just because someone feels strongly - or shouts loudly - about something doesn't make her beliefs true. Emotive language needs to be supported by reasons.
- **persuasive definitions**: this is a particular form of slanting which takes the following form: something, x, needs to be criticized (e.g. abortion); choose something most people consider bad (e.g. murder); define x in terms of that (e.g. abortion is murder of a foetus); therefore, x is rejected. Critical analysis is often aimed at the level of how a particular concept is interpreted, because from that particular interpretation other forms of thinking and doing are developed.

In summary:
Remember, critically engaging with something demands effort, discipline and commitment. You will need to re-write your draft a number of times, as you read and re-read the text. There are no short cuts!

PART 3 – LITERATURE REVIEW
Viv Bozalek and Nelleke Bak

All theses have to draw on the literature. Some theses have specific chapters that focus on discussing the main trends in the literature about a particular issue (the topic of the thesis), whereas other theses again draw on literature throughout the development of their discussions. So, no matter what the structure of your chapter outline, somewhere in the thesis you will have to give your reader an indication of the kinds of debates in the literature on the topic you are researching.

Work sessions with post-graduate students reveal that many don't know how to do a literature review. It is considered to be an essential early step in conceptualizing the research project (Neuman 1997:88). In this section of the guide, we'll try to demystify the literature review by focusing on what it is or how it is perceived by students, why you are required to undertake a literature review in post-graduate studies, how to go about doing the literature review and finally what the characteristics of a good literature review may look like.

What is a literature review?

Writing a thesis or academic paper is seen as an entry into the academic conversation that has been going on in the journals and books. Just as you would do when joining any other conversation, you'll first listen to what the conversation is about, what the main issues of debate are, and to who is responding to whom in what way. Your literature review section is a way of reporting to your reader on the academic conversation you are planning to participate in.

A literature review is seen in various ways by different disciplines and individuals, but it generally involves a search and documentation of primary (original) sources of scholarship rather than secondary sources, which are reports of other people's work. Cooper (1985:8) describes it thus:

> First, a literature review uses as its database reports of primary or original scholarship, and does not report new primary scholarship itself. The primary reports used in the literature may be verbal, but in the vast majority of cases are written documents. The types of scholarship may be empirical, theoretical, critical/analytical, or methodological in nature. Second, a literature review seeks to describe, summarize, evaluate, clarify and/or integrate the content of primary reports.(Cooper as cited in Bruce 1996:143)

This gives you some idea of what a literature review may involve. Another way of trying to get a firmer grasp on what it entails, is to start trying to establish how other students (and academics) understand it, so that you can build upon these ideas. Christine Bruce (1994) conducted a study in an Australian university on exactly this. She was interested in understanding what students made of the words 'literature review'. Her analysis of the results of student conceptions are useful in that they cover different aspects of what a literature review may involve and they also provide an idea of how a literature review progresses, first from a simple task to more advanced stages of the process. In the section that follows, are outlines of the six conceptions that Christine Bruce identified, as well as a brief description of what each stage involves:

1. *The literature review as a list:* In this conception the literature review is perceived as a list or collection of items – books, journal articles, or other sources which could possibly pertain to the research topic. This could include author's names, titles of articles and perhaps brief summaries of the contents of the text, as well as key words. The interaction with the literature at this stage is indirect or passive, in that you are merely reporting.

2. ***The literature review as a search*:** This is a more advanced step to the previous process in that you search the literature with the purpose of establishing what is relevant and important to your research topic. It is a more concerted effort to look for literature than the previous conception, but the interaction with the literature is still indirect and passive, as the focus is on the process of searching and identifying relevant sources.

3. ***The literature review as a survey***: Here there is an investigation of past and present literature on a particular topic or area of interest. It involves a more comprehensive scan of the literature on the topic, where you are able to establish the current knowledge base and research methodologies which have been employed to study the topic. The interaction with the literature is more direct at this stage, as your concern is with the knowledge base rather than the process of searching. The process is mainly expository, that is, you are concerned with giving a clear and fair summary of the content of the literature.

4. ***The literature review as a vehicle for learning*:** This is where you are actually critically engaged and gaining knowledge from the literature review. You are using this as a check for your own ideas. Here you engage directly with the literature and review it with the purpose of informing your own ideas on your topic. The focus here is multidirectional as you are concerned with how the literature is influencing or impacting on your perceptions of the research problem.

5. ***The literature review as a research facilitator***: This is an advanced stage of the literature review. Here your research interests are used to justify the necessity for conducting research. Engaging with the literature helps to shape the research and give direction for how to conduct the study. The focus again is multidirectional in that the literature is used to impact on the research project itself.

6. ***The literature review as a report***: This is the final stage of the interaction with the literature, where you move beyond considerations on how it shapes the project to the development of a report, synthesizing the literature and discussing where the literature is either supported or challenged through the findings of the thesis.

Some literature reviews form standard chapters of a thesis, particularly in the natural sciences and in quantitative traditions, while others, especially in qualitative approaches, can be dispersed in various chapters within the thesis. In many cases, the whole thesis is a kind of extended and detailed literature review. Even though there may be differences about where you decide to place the literature review, or what you see as its purpose, all of the above stages may help you to identify the different interactions that you can engage in with the literature at different phases of your research. From the above categories, you can see that reviewing the literature is a continuous **process.** It begins before a specific research problem has been formulated and continues until the report is finished. It is also a **product**, where it is written as part of the thesis. As a product it has specific purposes, which the next section will address.

To summarise:
- the literature review draws mainly on primary sources
- it can have a variety of purposes (to help you identify a suitable topic for research, to help you identify relevant literature, to help you get an idea of what the main debates on your topic are, to help you understand the issues involved, to help inform your own ideas about the issue, to gain familiarity with the accepted research approaches and methods in the discipline, and to become a critical co-conversant in the academic conversation)
- it is a continuous process which begins before a research question is even formulated and continues to the end product which is the research report or thesis (and perhaps beyond this

stage if you are going to be orally examined on the thesis and you need to keep up to date with literature until this event)

- it is a well-written, coherent product, appropriate to the purpose for which you need it.

Now that you have some idea of what the process of a literature review may involve, the question that needs to be looked at more closely concerns the reasons for engaging in a literature review – why is it regarded as an essential part of the thesis?
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Why do I need a literature review?

This is related to what we see as the major purposes of a literature review. A literature review is based upon the assumption that research is not something that happens in isolation, but is something done and developed by a community of academic researchers. (Think of the "academic conversation" analogy – you can't have a conversation all on your own!) This means that knowledge is seen to be cumulative and that you can learn from what other researchers and writers have done. What you are researching in the present must be built upon the knowledge of what has been researched before. Researchers read studies to compare, replicate or criticize findings of other writers (Neuman 1997:89). When you are participating in the academic conversation – writing a thesis is a way of participating in that conversation - you are responding to issues raised, drawing links between what various authors have said, showing where there might be some contradictions, or raising some considerations that haven't been addressed yet. But you can do this only if you know what the conversation has been and is about, i.e. if you know what the past and current debates in the literature are. In fact, if you refer to the guidelines that UWC gives all examiners of theses (*see Appendix VIII of the Thesis Guide*), you will notice that examiners are asked to check whether you demonstrate in your thesis familiarity with the relevant literature.

Ranjit Kumar (1994) has put together a useful list of potential uses of a literature review. However, many of the points below have been identified and added by post-graduate students at UWC in workshops run on how to conduct a literature review. Look at the following list of potential uses that a literature review may have for you:

- ***The literature review helps to bring clarity and focus to a research problem.*** You cannot undertake a literature review unless you know what you want to find out but, on the other hand, the literature review is also necessary in helping you to shape your research problem. This is because reviewing the literature helps you understand the subject area better and so helps you to conceptualise your research problem clearly and precisely. It helps you to understand the relationship between your research problem and the body of knowledge on the area. In other words, the literature contributes to your understanding of why your research problem *is* a problem! In doing the literature review you are able to identify information and ideas that may be relevant to your project. (Kumar 1994:26)

- ***The literature review helps you to identify gaps.*** In order to know what the obvious gaps in the current state of knowledge are, you have to know what the literature in effect covers. In doing the literature review you become aware of what has already been done and what remains to be done. Be careful of claiming that there are gaps in knowledge when you have not done a thorough review of the literature. This is a common error in naïve and inexperienced research students.

- ***The literature review prevents you from merely duplicating knowledge***. You may feel excited about a particular idea and believe that you are the only person to have this idea, and then discover that it has been thought of before when you read the literature. In doing a careful

search of the literature, it helps you not to 'reinvent the wheel', in other words it helps you to avoid merely duplicating research of others. Of course, planning to replicate studies (a legitimate form of research), or aiming to research an issue to which there is no definitive answer (e.g. the link between mind and brain) is not merely duplicating research. You are contributing to the body of knowledge by either validating previous research, or contributing some new insights on a long-standing problem. Very few theses have a definitive answer to a problem, so don't think because the problem has been written about already, that the final answer has also been furnished. A literature review is also useful to get to know what has worked and what has not in terms of methodology, so that you can avoid making the same mistakes as others.

- ***The literature review helps you to broaden your knowledge base.*** You should read widely in the subject area that you intend to conduct your research study in. It is important that you know what other researchers have found, who the major research *authors* or what the *seminal works* are in your field, what the *key issues* and *crucial questions* are and what *theories* have been put forward in the relevant body of knowledge. You will also be able to see how others have defined concepts which you will be using – what the widely accepted definitions, or interpretations, are and you will be better able to work out interpretations of key concepts that suit your research purposes from this knowledge. Most fields of study have over the years developed their own research practices and conventions. Consult the literature to familiarize yourself with the acceptable research conventions and approaches adopted in the written up research (literature). When you undertake a post-graduate study you are supposed to be an expert, or at least an apprentice who demonstrates 'mastery', in your area of study. The more you know, the better position you are in to study your topic. "Self-study reviews" help to increase your confidence in the area, and helps you to familiarize yourself with the main issues.

- ***The literature review helps to contextualise the research project***. You must provide a signpost for your readers about 'where your research topic and approach are coming from'. This signposting allows the reader to see which theories and principles have been influential in shaping your approach to the proposed research. As has already been indicated, the literature review enables you to build a platform based on existing knowledge, from which you can carry on and explain what your contribution will be to the field. (Remember, for a Master's thesis a *modest*, but of course rigorous, contribution is sufficient.) The literature review can put your study into historical and other perspectives and provide an intellectual context for your work, enabling you to position it in relation to what others have written. "Context reviews" help you to: place the project in the larger picture; to establish links between your topic and the existing body of knowledge; to establish the relevance and significance of your research question, and to establish the possible implications of your position.

- ***The literature review can improve your methodology***. Going through literature helps you to acquaint yourself with the methodologies that others have used to answer research questions similar to the ones you are investigating. You can see what has worked and what has not worked for others using similar procedures and methods, and the problems that they have faced. In learning about the methodologies that others have used you will be more able to select a methodology which is capable of giving you valid answers to your research questions (Kumar 1994:26), and which is appropriate for the field in which you are studying. "Methodological reviews" help you to point out how methodologies vary and what the dominant approaches are.

- ***The literature review may assist you to identify opposing views.*** A literature review can help

to identify differences between your study and previous studies. The idea that research builds on earlier work does not necessarily imply that it extends, flows or approves of the earlier work. Your work may be highly critical of earlier work and even seek to discredit it. However, even if you are critical of a particular theory or methods of conducting research, you will still need to review the literature to argue the weaknesses of the work and the benefits of the alternative approach which you have chosen. You cannot justifiably reject or criticize something if you don't clearly understand (and demonstrate to your readers that you clearly understand) what it is you are rejecting or criticizing. "Integrative reviews" help you to: present the current state of knowledge; and pulls together disparate findings.

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How do I start on my literature review?

Many post-graduate students do coursework before starting on a minithesis. Your coursework and assignment readings are an ideal starting pointy for your minithesis. However, your topic for research will need additional sources of information. This section will focus on four different activities in relation to the doing of the literature review viz. searching for information, managing the information, reading and writing.

1. Where and how do I search for information?

You need to know how to use the computers in the library and how to use indexes and abstracts. You can organise searches based on subjects, themes or key words. It is good to find out who your subject librarian is and to make friends with her or him. Inter-library loans at UWC are useful for students and provide an efficient service (they are situated on Level 4 of the library). As a student you can also make use of all the libraries on the CALICO system – UCT, Stellenbosch, UWC and both technicons. You will have to request a letter from the University Chief librarian to get access to these institutions.

Type of information source	Location	Means of accessing the source
Books, monographs, conference proceedings, reference materials	Library books	Library catalogue
	South African titles	SACat on SABINET SA Studies CD-ROM
	Overseas titles	Bookfind WorldCAT Internet search engines and directories
Journal articles	South African journals	Index to South African periodicals (available on SA Studies CD-ROM or online)
	Overseas journals	General and domain-specific indices. (See Mouton, 2001, chapter 13 for an extensive list)
	Online journals	Internet
Newspapers, magazines, reports	South African media	SAMedia
	Overseas media	Internet
Theses and dissertations	South African theses	SA Studies
	Overseas theses	Dissertation Abstracts International

Taken from: Mouton (2001:88). See also Mouton (2001:89) for some additional useful sources.

When searching databases and the library, it's important to establish the credibility of the source. Is it an academically acknowledged data base? Are the entries still relevant? The date of the publication is important: for empirical studies you should concentrate on the latest publications and work backwards from these as they become out-dated. Remember, this is because researchers build on the work of those that have gone before (just like you need to do in your own thesis.) With theoretical articles it is not so important to have the most current article, since you might be drawing on classical texts that are more dated.

The quickest way of getting an overview of the trends in the debates is to look at the **journals** in your subject area. First of all, identify the most important journals in your field of research. Ask your subject librarian, your colleagues, fellow students and your supervisor. What topics are the journal contributors writing on? Can you trace the development of the debate over a number of journal publications? Who do the contributors list in their reference lists? Are there some key texts that many writers refer to? If so, get a copy of it. Are there some references that look as though they focus on your chosen specific topic of research? If so, try to get copies. Once you have an overview of the debates and key texts cited in the journals, move on to **books**. Use the index of the book to see whether your specific topic is addressed. Again, look at the bibliography for references which may be pertinent to your study. Also, have a look at completed **theses** on your topic of research. All libraries stock these. You will get an idea of what makes a successful thesis in your discipline. You can compare the thesis and any publications which come from it with what you intend to do. You can look at what is required at UWC and look at ones from other SA universities and international ones. Library staff will be able to help you locate these. More important authors tend to be quoted more frequently and you will be able to tell who the highly regarded theorists are in your field by perusing the literature.

Internet searches

The Internet is a terrific tool for getting information, but you need to know your way around it if you want to avoid drawing on inappropriate sites. Some journals are now available in electronic form on-line and you should check which of these are available at UWC in your field. Although some journals are available in this form, it should not be seen as an alternative to searching the hard copies of literature in journals and books. This is because most literature is still available only through these hard copies. The Internet is also useful for what Mouton (2001:35) calls 'grey material' which is information such as government policy documents, speeches, press releases etc. The advantage of the Internet is its immediacy of access and information is often very recent. But you must be careful of what you find on the Internet as anyone can write anything there – so, unless you know that the site is an academically acknowledged one, you can't be sure of the credibility of information you find there.

See Appendix A for some useful academic databases and search engines.

2. How do I store and manage the information?

In searching the literature it is very important to develop some sort of filing system – either a hard copy or on computer. Remember to store all details so that you don't have to go back to the original sources. This can be a very annoying job when you are ready to hand in the thesis but have outstanding or incomplete references which have to be tracked down. Details on the following should be kept and arranged alphabetically:

Author (Surname and initials)
Title of book (if a chapter in an edited collection, then note the title of the chapter)
Journal title (and title of article)

Journal Vol no Month Year
Place of publication
Publisher
Date
Library where information is Call no
How item relates to research project
Relevant pages

It is important to keep these sources accurate and consistent. You can either write the details of each reference separately on a blank "library card" (on sale in any stationery store), which you file alphabetically, or you can use a software programme , like Research Toolbox (available from UWC), to enter your references.

See also Part 5 on how to reference correctly and avoid plagiarism

3. How do I read for the literature review?

There is no shortcut to your academic writing. You must read. But there are different ways of reading. The process of reading has three different aspects: *preview* which is the most broad and superficial sweep of the literature, the *overview* which is slightly more engagement with the material and the *inview* in which the material is read very carefully for understanding.[1]

See also Part 2 on "How do I start to engage critically?"

Preview

There are plenty of books, journals, Internet information etc available to you as a university student. You can waste hours reading irrelevant information and in this way procrastinate about getting down to writing. You need to become skilled at selecting the right texts for your purposes. In order to do so you need to be able to preview books quickly, by looking at the title, date of publication, author or organisation responsible for publication, and the contents pages. You do this keeping in mind your purposes for reading:
- The title – *from this you can predict whether some of the information for your research project may be covered*
- Table of contents/sub-headings – *will some of the necessary information for your research question be covered? Will it be directly relevant to the specifics of your topic, or just give you a broad overview? Which chapter/s or sections look relevant to your research?*
- Date and place of publication – *is the book fairly current and up-to-date?*
- The author(s)/organisation/publisher – *are they reputable? Have you heard of them before? Is there any information on them? Are they attached to a credible institution?*

In the preview stage it would help you to locate literature if you jotted down the topic, what you know about it, what you would like to know about it, any questions you have about it, and the value it may have for your literature review.

Overview

Once you have selected the book or section you want to read, the best way to begin to understand it is to get a sense of how the whole book or section is structured. You can do this by overviewing the

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[1] These terms and the explanations of them are taken from a Guide to Social Development Post-Graduate Students at the University of Cape Town compiled by Catherine Hutchings in 1999.

chapter or article. This will give you a sense of the whole framework or structure of the chapter, so that when you read it in detail you will be able to fit what you read into the whole context of the chapter. Not only will the overview help you to find information quickly, it will assist your understanding as you read.

In doing a survey or overview, you should concentrate on headings, subheadings, introductions and conclusions, the opening and closing sentences of a section, graphs and tables, and any summaries that the book or article provides. The advantages of doing an overview are the following:
- The more access to background knowledge you have, the easier it is to add new information.
- If you have a sense of the whole, you understand the details better.

Inview

This involves a detailed and careful reading of the subject matter– ensuring that you understand the concepts and follow the argument. Take clear and detailed notes of everything you read. Keep your research question in mind and don't record pages of information which aren't relevant to your work. You could keep summaries of your readings on a particular file or in a software programme such as Nvivo, NUDIST, Research Toolbox or just on a Microsoft Word package. Don't forget, at the same time, to record all the necessary details of the reference. In your summaries you could include what the main issues and arguments are, a critical comment on these and how the content relates to your proposed project.

You should have read broadly and deeply in your field of study before beginning to write a literature review, so that you can locate the study in a wider theoretical landscape. Then read deeply in the narrower field of the research question, so that you have a detailed account of existing literature as it relates to your study.

After reading in an intensive way you need to make notes of your own, draw a mind-map, respond – you begin to prepare an argument for your literature review. Select suitable structure in terms of which to organise the literature. Use sub-headings.

You could begin your inview of the literature by finding an introductory text or key articles which introduce the main concepts and theoretical language in your area. Try to identify the concepts that you don't understand and discuss these with your supervisor. You should develop a conceptual map and try to fit new readings into this map. Pull together themes and issues that belong together. Once you have developed a map or rough structure of your draft framework, you will keep slotting information under the headings that you develop.

Kumar (1994:30) suggests the following:
- Note the theories put forward, the criticisms of these and their basis, the methodologies adopted (study design, sample size and its characteristics, measurement procedures, etc.) and the criticisms of them;
- Examine to what extent the findings can be generalised to other situations;
- Notice where there are significant differences of opinion among researchers and give your view about the validity of these differences;
- Ascertain the areas in which little or nothing is known – the gaps that exist in the body of knowledge.

Theoretical framework

Students in general struggle with this section. A possible reason for this is that there is no clear-cut theoretical framework – the question about which framework in your subject area is the more

appropriate one, is itself a question of debate within the literature. The theoretical framework is where you would highlight the main thrust of the academic conversation you are entering. Note the similarities and differences between themes and theories – agreements and disagreements among authors and the bearing that these have on your research topic. You would use these as a basis for developing the theoretical framework that would be best for your thesis purposes. *What a framework does is to set up some key concepts, interpretations, approaches, claims, foundations, principles, etc in terms of which you design the structure, sort the information and analyze the findings of your thesis.* Unless you review the literature in relation to this framework, you won't be able to develop a focus in your literature search. In other words, the theoretical framework provides you with a guide as you read (Kumar 1994:31). You have to first go through the literature to develop this framework and then have the framework to go through the literature. A good idea would be to go through some of the literature to develop this framework and then use the "skeleton" framework to guide further readings. As you read more you may change the framework, but if you don't have some structure, you will be bogged down in a lot of unnecessary readings and note-taking not relevant to your study. The theoretical framework is the basis of your research problem. Of course, there are competing theoretical frameworks put forward to explain the issue you will be researching, so you will need to discuss, based on the arguments put forward by other authors, why this particular framework is appropriate for your purposes.

Students often look for big "isms" as their framework. This is not necessarily the best way to proceed. Big "isms" are contested terrain themselves and putting a label onto something may just hinder rather than help you in your investigation. What you do need to be clear about, however, is the interpretation of your key concepts, the method in terms of which you'll design your research and the organizing principle you'll use to make sense of what you are investigating.

Delamont (1992) talks about three kinds of reading – reading *about* (broad background), *around* (often reading for contrasts) and *on* the topic (the kind of inview reading discussed above). If you are stuck for new ideas or imaginative approaches, it might be useful to read something that juxtaposes an aspect of your topic. For example if you are looking at women you would examine the same situations for men. Or, you could hold one variable constant and vary the time, place, group, or context e.g. higher institutions in the Western Cape in contrast to other provinces or universities in relation to other higher education institutions; the sexual behaviour of gay men with HIV/AIDS could be contrasted to the behaviour of straight men.

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4. How do I write my literature review?

Your writing should be signposted at every point, e.g. you should say what you are going to do, then do it and then say what you have done. You will need to do and redo things – the process of research and writing is messy and doubles back on itself. Only in the end does it appear as seamless and linear. Even the best authors you read, have re-worked their text many, many times before it was finally printed. Coherence only emerges over time.

In the literature review you should be presenting an exposition (a clear and coherent summary with a particular purpose) of the issue you are studying, which you then use as the base for an argument. Rather than just stating facts, an argument tries to persuade the reader to a particular interpretation. You can use the findings of other authors to support your claims. You should have a central argument (the main point you want to put forward) and then use each paragraph to develop a part of the main argument. You should state the argument early on and sum it up in the conclusion. All points made should link to the main argument.

How to organise a literature review (Mouton 2001)

- *chronologically* by date of study. Here you would start with older studies and work towards the latest. This is the least ordered of the literature reviews.
- *school of thought/theory*. This is a review of the theoretical positions or scholars and would form the theoretical framework. You could organise it from oldest to most recent or you could start with approaches or definitions which you feel to be inappropriate, or which have been discredited by recent scholarship. You would then follow this with a discussion of points which would form the frame of reference for your study.
- by *themes* which have emerged from the literature. The headings should be based on the literature and should be precise, descriptive of contents and should follow a logical progression. Substantiations and contradictions should be clearly referenced. Your arguments should be conceptually clear, highlighting the reasons for and against, and referring to the main findings, gaps and issues.
- by *method*. You can for example compare quantitative and qualitative studies and show how the methods produce different sets of results. Most disciplines have conventions of research practices. Discuss what these are in your subject area.

Try to answer the following questions:

1. What do you consider to be the most important theories/perspectives to arise from the literature? How have these affected your understanding of your topic?
2. How does your research link with the state of knowledge as reflected in the literature?
3. What questions are raised by the literature which your research addresses?
4. Has anyone ever done this before, what partial answers to your question have been found before, how did previous researchers go about asking such questions, what methodological issues are raised by the literature in question?
5. How does your review add value to the literature? Don't just summarise.
6. In what way is your topic valid, important and doable?

If you're still undecided on how to construct your literature review, here is a suggestion on how to get started:

> Go back to your research proposal and the ten key words (or phrases) you have noted as capturing the main concepts of your thesis. Jot them in a column down a page. Then, for each concept jotted down, ask yourself: "What does the literature say about this?" Next to each one, identify three or four readings that address this concept. Make clear and honest summaries of each reading. Then critically engage with your summaries, noting trends, similarities, differences, gaps, implications, etc. Re-write this draft into flowing text. Do this for each listed concept, (the concept can be a sub-heading), and you'll have the first draft of your Literature Review.

In the writing process you should keep a log or a journal of information-gathering and the writing process. Ignore references that aren't relevant any more – pare the references down if needed.

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Criteria of a good literature review

The literature review has been reported as the second most deficient chapter in theses by examiners (Bruce 1996:151) Areas in the literature review which are commonly regarded as deficient include the following:
- Exclusion of landmark studies

- Emphasis on outdated material
- Adopting a parochial perspective
- Not being critical
- Not discriminating between relevant and irrelevant material
- Lacking synthesis (Bruce 1996:151)

Delamont et al (1997:59) have three suggestions on how to develop a good literature review:
- make sure that things aren't left out by keeping up with all relevant studies in the field.
- keep reading throughout your thesis production so that your ideas are current.
- avoid being boring by arranging your review in themes, highlighting findings that are relevant to your thesis. You should be critical of the literature, not just report it.

Your literature review should be something which you, yourself, enjoy reading rather than a boring list of summaries of what you have read. You are an emerging expert on your topic and must show this. You have to be able to demonstrate to fellow scholars that you are familiar with the academic debates in the field, have defined your topic of investigation in an appropriate way and that you have a (albeit modest) contribution to make to the field. You should be able to show why anyone should care about your topic, raise the problem you have found, and pave the way for an interesting and sound investigation. At Master's level you are *not* expected to make an original contribution, develop a new approach or solve a problem in an innovative way. What is expected, is a demonstration of the main academic skills you should have "mastered" at this level. (See the *Thesis Guide* for the criteria in terms of which Master's and Doctoral theses are examined)

You should be able to organise the main academic debates and findings in the field. Discuss these in a logical and meaningful structure, i.e. one that has a specific purpose it steers towards and a conceptual thread that binds the sections together. Of course, you should correctly cite all sources mentioned. There are software packages e.g. Endnote or Research Toolbox used for constructing references.

In a well-constructed literature review, you should demonstrate that you are able to identify:
1. the major context into which your work will fit
2. the major stages, developments of the field
3. the major issues, problems, controversies
4. the major texts, personalities, and schools
5. the major methodologies and approaches

Your review should cover the main aspects of the study and be fair in its treatment of authors. The literature review should do justice to the author's arguments *before* critiquing them. (You can't agree or disagree with something if you don't have a clear idea of what it is you are agreeing or disagreeing with!) It should be topical. It shouldn't be confined to Internet sources. It should be well organised around the research questions and key concepts rather than being summaries of what you have read. Take note of the authority of authors and the reliability and validity of their methods.

There's a delicate balance between discussing what others have said and found, and developing your own "voice". You are neither just listing what others have said, nor are you merely "telling your own story" – you need to demonstrate that you have an *informed* voice. So, don't quote too many studies or always begin with "Smith (1999) found that ……", as it takes away the focus of your own argument onto that of others. It is better to develop a theme and then cite the work of relevant authors to buttress your argument. Using your own words to describe difficult concepts will help convince yourself and others that you really understand the material.

In summary:

The literature review should be specific, current and of historical interest, coherent, interesting and well organised around the research questions and key concepts rather than being summaries of what you have read. It should be a critical discussion of relevant information from different sources Don't be tempted to report everything you know – be selective about what you report. Every reference you use must build on the evidence you are presenting to support your 'case'.

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How many references should I have?

I once supervised a Master's thesis that had only 8 references in the bibliography – the student did an in-depth study of a particular key author's interpretation of the concept of "enthnocenticity". Some authors I reviewed stated 100 books for a Masters thesis and about 400 for a Doctoral one, but as Mouton (2001:96) has observed and as the thesis on ethnocentricity shows, it depends on the field you are in and the purpose of your thesis. Mouton did a survey of theses at Stellenbosch University and came up with the following table. As you can see, the range is extensive:

	Master's		Doctoral	
	Range	**Average**	**Range**	**Average**
Humanities	20 - 540	170	150 – 670	380
Social Sciences	20 - 220	93	150 – 580	320
Health Sciences	28 - 215	100	25 – 380	200
Natural Sciences	16 - 140	96	34 – 275	172
Engineering	20 - 156	70	24 - 210	110

Mouton (2001:96)
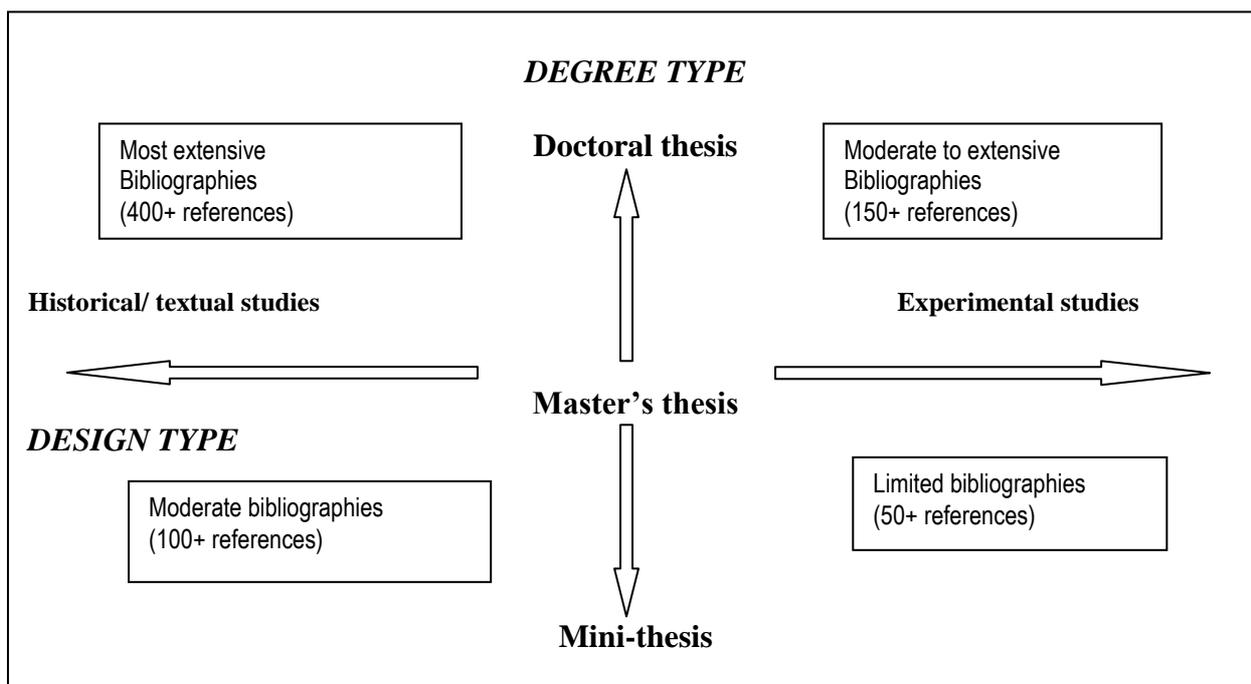
Mouton (2001:97)

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PART 4 - INTRODUCTION TO SCIENTIFIC WRITING FOR STUDENTS IN THE NATURAL SCIENCES

Susan Bassett, Lucille Oliphant and Nelleke Bak

"Scientific Writing is not a Science… it is a craft" (Day, 1983).

You will not be able to master the skills of scientific writing overnight, it takes lots of practice!

Research ethics and the requirements of scientific writing

Before conducting your research you need to be familiar with scientific research ethics and the requirements of scientific communication. The following section is a brief overview of ethical codes and considerations. The contents of these codes vary according to discipline. The following are the most common categories of obligations or responsibilities that scientists have:

1.   The practice of science (academic ethics)

The ultimate goal of all science is true knowledge. So, as a researcher, you are morally committed to search for truth and knowledge. But what does that mean, and how do you go about it? The following professional ethics apply:

- You should at all times strive to maintain *objectivity and integrity* in the conduct of your scientific research.
- You should not under any circumstances, change your data or observations referred to as *fabrication or falsification of data*. This is regarded as one of the most serious transgressions of the scientific code of ethics.
- You are required to adhere to the public nature of scientific practice. The implications are that you should *record your own data* and should at all times be prepared to disclose your methodology and techniques of analysis.
- If you are planning to publish your research, the ethics of publishing involves the following specific issues:
  - *   Appropriate ascription of authorship to a publication
  - *   Rejection of any form of plagiarism
  - *   No simultaneous submission of manuscripts

2.   Relationship to society (professional ethics)

The most important principle that guides the relationship between science and the rest of society is that of *accountability*. Although we sometimes refer to the scientific community as a distinct and relatively autonomous sector of society, this does not mean that it is allowed to do what it wants without regard for the rights of the rest of society. As a member of the scientific research community, you therefore have a degree of accountability that does not involve the specifics of research projects, but refers to a general obligation to conduct your craft in a socially responsive and responsible manner. Accountability in science is manifested in the following ways (Mouton, 1996):

- No secret or clandestine research.
- An obligation to the free and open dissemination of research results.
- A responsibility to funders and sponsors of research. A substantial proportion of research in South Africa is funded by government or public institutions. This means that large numbers of scientists and students receive money from sponsors through funding agencies, foundations, contracts and commissions.

3.   Responsibility to the subjects of science (Subject ethics)

Scientific research invariably involves studying beings in some form or another. Where research involves the acquisition of material and information provided on the basis of mutual trust, it is essential that you protect the rights, interest and sensitivities of those whom you are researching. These are:

- The right to privacy (including the right to refuse to participate in research)
- The right to anonymity and confidentiality
- The right to full disclosure about the research (informed consent)
- The right not to be harmed in any manner (physically, psychologically or emotionally)

In addition, "vulnerable" groups (children, the aged, the mentally handicapped) may have additional specific rights that should be taken note of.

### 4.   Relationship to the environment (Environmental ethics)

If you are conducting research that might affect the environment, you have a special obligation to ensure that the consequences of your research do not harm or damage it in any way.

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Scientific Communication and the writing process

Communication is the base upon which all the other aspects of science rest - without communication, science is dead. Communication in science takes a number of forms, including primary scientific papers, technical papers, books, popular articles, conference talks, and conference posters.

Good science involves a reciprocal process of reading, theorising, hypothesising, testing, information gathering, integrating information, and communication.

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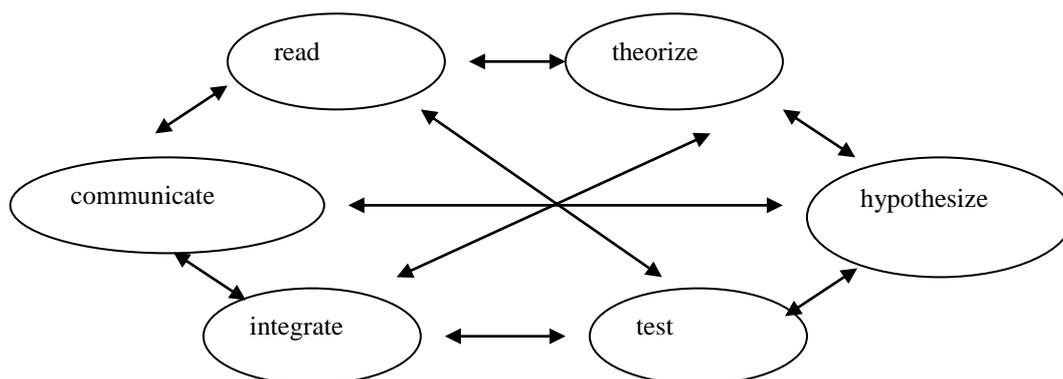
Common structure of a thesis in the Natural Sciences

There are many different ways of structuring a thesis. In general, the theses in the Natural Sciences follow a fairly set structure. There are logical reasons why there is a conventional way of structuring the thesis in the Natural Sciences. It lets the reader know, in a logical progression: why this research was done - it convinces the reader that the problem is worthy of investigation; how it was done - what methods were used to provide evidence; and what was achieved – the thesis must demonstrate that the problem has been solved, that the hypothesis has been tested. Within your thesis structure, your argument will proceed from the development of the problem statement and hypothesis to an analysis of the evidence and the conclusions drawn, based on the evidence. The following points should be

considered within each section of the thesis:

1.   The thesis **title** should be short, clear and to the point; no more than 2 lines long.
2.   The **Introduction** should present the topic and explain why it is important. You are developing the idea of your thesis and motivating the study. Begin by contextualising your study, i.e. how you decided on the topic and what is its relevance / importance. Show you have done some preliminary reading by providing a background to your topic. Then state your **problem** as simply as you can. What do you hope to discover/prove? This sets up the **hypotheses.** *The introduction is the beginning of your argument.*
3.   The **Review of Literature** section should demarcate the literature covered. Where did the problem come from? What is already known about the problem? What other methods have tried to solve it? Basically include all literature leading to the development of the hypothesis should be covered here. *This is part of the evidence for your argument.*
4.   The **Methods** section should explain the sample in terms of design, size and sampling techniques. All methodology should be described fully so that a competent colleague could repeat the experiment. Briefly describe all statistical analyses used. *How are you going to prove your hypothesis?*
5.   The **Results and Discussion** section goes over what you have found and what it means. How do your results fit into the existing body of knowledge? *Discuss your evidence* here, i.e. the main trends and patterns in the data with reference to your hypotheses. Show the connections between your results and the literature reviewed earlier.
6.   Finally, **summarise and conclude**. The question to ask is "So what?". *You want to convince your reader to agree with your argument.* Highlight the main points of the thesis, then draw any conclusions. Do your results confirm your hypotheses? If not, suggest reasons. What next? Make **recommendations** for future work / research.

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Introduction

Logic is the science of reasoning. It is the act of advancing and clarifying arguments, reasons and evidence in order to reach certain conclusions. **Reasoning** is the process of making deductions or drawing inferences; linking what is known (fact) with something new (conclusion). The scientific method of research is a rational, systematic thought process that is used to figure out facts and truths. The "logic" of your thesis refers to the principles of reasoning that are employed in the construction on your main arguments. The "structure" refers to the way in which you plan and organise it so as to present your case in the strongest possible manner. Your aim is to convince your reader that the evidence that you present supports the conclusions that you draw. You want your reader, after having read your thesis, to concur with your argument.

The basis of the scientific method is to ask questions, then to try and come up with an answer. However, you have to be able to *prove* every answer you give. Scientists do this by starting with an *observation*, formulating a *hypothesis* then trying to prove it with *trials and tests*. Once the trials and tests are completed and *analysed*, a thesis is written, which is simply a scholarly argument, which attempts to convince the reader of something.

The hypothesis is the uniting force throughout the thesis and the thesis develops the argument to test a given hypothesis. Developing a good hypothesis is usually one of the most difficult parts of writing a thesis. Don't expect it to come easily. However, you need a good hypothesis so that your readers know what you are arguing from the beginning, and can then evaluate your argument as they continue to read.

Hypothesis

The hypothesis is central to the scientific method of research and to the thesis you are about to write. It is a **reasonable "guess**" based on what is currently known about the specific topic. The statement is **testable** i.e. it can be proven to be **true or false**. A useful hypothesis may include a prediction and proposes a relationship between two or more variables:

1. Independent variable (I.V.)- it is the one you the scientist controls.
2. Dependent variable (D.V.)- the one you observe and/or measure the results.

Example: Salt in soil may affect plant growth.
I.V. =salt
D.V. = plant growth

Reasoning

The term 'reasoning' refers to the structured way in which you want to communicate your main ideas. In logic, we often refer to the two broad methods of reasoning as the deductive and inductive approaches. *You should use reasoning to formulate your hypothesis*.

1. Deductive Reasoning

With deductive reasoning you start with a fact or principle, which is called a PREMISE. Then you come up with CONCLUSIONS based on the premise. Think of it this way...

1. If this happens...
2. And this happens...
3. Then you can come to this conclusion.
If the premises are true and the argument is valid then the conclusion will also be true.

The application of an accepted law to a specific situation:

Theory/ Principle / Fact
⇩
Hypothesis
⇩
Observation
⇩
Confirmation
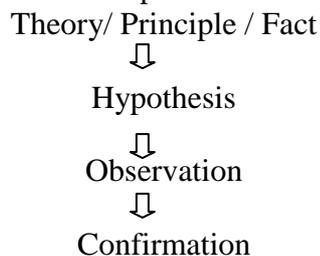
Example:
1.   Rocks fed to Rocky-whales results in a low concentration of iron in their blood and a high concentration of fat in their milk.
2.   Lush pasture fed to Rocky-whales result in milk with a stable iron content and a moderate concentration of fat.

If from the above statements we accept the general principle that rocks produce high levels of fat, we can deduce that if we feed high levels of rocks and lush pasture to the Rocky-whales we can raise the concentration of fat in their milk.

The hypothesis may read as follows, "Rocks will raise the fat content of milk for Rocky-whales grazing on lush pasture." This is testable.

2. Inductive Reasoning

Inductive reasoning works in the opposite direction. You start by having a number of observations."I see that." "That happens here." "I believe that this will happen just like the others because the circumstance is similar." It usually has the following steps:

1. First you start with specifics.
2. Then you organize data about these specifics into categories (saying "What do these have in common?").
3. Then you formulate a possible explanation for the commonality in a hypothesis.
4. Then you test the hypothesis under various conditions.
5. If the various testings confirm the hypothesis, you formulate the hypothesis into a statement that can be generalised (a theory, principle, axiom).

Induction is the logical process of assembling facts until a conclusion, usually a generalisation, is reached.

<div align="center">

Observation

⇩

Confirmation / Replication

⇩

Hypothesis

⇩

Theory / Principle / Axiom / Generalisation

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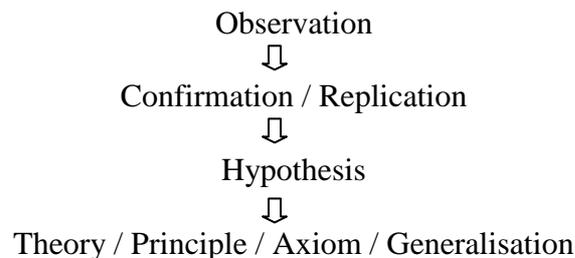
Example:

"Repeated seaweed feedings to Rocky-whales result in a high concentration of iron in their blood and milk with a low concentration of fat."

This is data about specifics. If you want to formulate into a more generalised hypothesis, then you can formulate it as: "*Seaweed increases the iron concentration in the blood*". This general principle can, in turn, be tested experimentally.

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Argument and Evidence – based on the literature

The argument refers to the ideas that you will work with in your discussion in order to make a certain point and to draw a certain conclusion. They are called "arguments" because you will have to justify them in the face of what is already known about the subject (as written up in the literature). You will also have to present your limitations honestly. In the case of all academic writing, it is important to organise your reasoning and present your arguments in an appropriate manner. The best way to do this is to use a series of connected paragraphs, each of which provides one point in the line of reasoning. The supporting sentences of the paragraph should then be the **evidence**.

But what is evidence? You support your hypothesis by providing evidence. Evidence can be either weak or strong, depending on how it is presented. Consider the following sentence:

"Keats & Maneveldt (1997) showed that the criteria used to separate genera of the Melobesioidea are unstable."

This is weak evidence, because Keats & Maneveldt (1997) may have gotten it wrong, or may have used weak evidence themselves.

A much stronger form of evidence would have presented the exact evidence, albeit in summary form, that they used to show this point. So. a more powerful line of evidence would be as follows:

"Keats & Maneveldt (1997) studied several species from different genera and showed that there exists a gradation of spermatangial system branching, from simple through highly branched, thus indicating that this character is not useful to separate genera in the Melobesioideae."

Don't report merely the conclusion, but rather the nature of the evidence. In the weak example, appeal is made to authority to support a concept. In the strong example, the exact scientific results are used, and the line of reasoning is strengthened.

If you write a literature review for your scientific journal article or thesis you should avoid using predominantly weak evidence in your line of reasoning.

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How do I assemble the Discussion and balance the Argument?

While you were collecting, processing and tabulating your data, you will have formed a number of ideas that might be developed in the Discussion. *The Discussion then becomes a collection of arguments about the relevance, usefulness, and possibilities or limitations of your experiment and its results.* Each of your arguments must be developed systematically in a series of paragraphs. Therefore the technique of developing arguments is identical to that of good paragraphing.

But what is a good paragraph? A good paragraph focuses on one main point / premise only, e.g. on the relevance, the structure, the usefulness, the possibilities or limitations of your experiment, each aspect of the results. Each paragraph follows logically from the previous one so that you build up your discussion systematically.

You should always balance your argument so that the important ones appear instantly important and their impact is not reduced to minor arguments. It is advisable to set out in note form all the arguments that you expect to use in the Discussion and clarify the importance and value of each. You should examine each argument and grade it.

Use the following **grading system** suggested by D. Lindsay (1995), the author of *A guide to scientific writing* in order to help you balance your argument*:*

> **AAA:** Those arguments that are relevant to the original hypothesis but allow you to make a positive statement of acceptance or rejection.
>
> **AA:** Those arguments that are relevant to the original hypothesis but which for some reason are equivocal (of doubtful meaning, questionable), or which lead you to suggest further experimentation or observation before acceptance or rejection.
>
> **A:** Those arguments based on your results, not relevant to your original hypothesis but which you consider sufficiently new or interesting to be worth including.
>
> **B:** Those arguments based on your results, not relevant to your hypothesis and of marginal interest.
>
> **Cross out all arguments in category B** or any that you could not easily classify. The arguments that remain are the basis of your Discussion and you have classified them in descending order of importance.

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How do I Present and Interpret the Data?

It is advisable to consult your supervisor at this stage to facilitate at this crucial phase of your writing. If necessary, consult a qualified statistician to assist you. Once the experiment is completed, you must (a) analyse and interpret the results and (b) draw conclusions as to whether the results support the hypothesis. These two parts of the scientific method are presented in the Results and Discussion sections of a scientific paper. The **Results** section is where data are presented often as figures, tables or statistics. While the **Discussion** encompasses more than just conclusions and interpretations of the research reported. It also reviews the research in relation to previous studies in the area.

Results

After your data has been collected you have to decipher what it means. This is done in the Results section, in the form of:
- Tables
- Figures: graphs, charts, drawings
- Written text.

Tables and figures should be used to document information that cannot adequately be described in the text. However, it is important to note that poorly presented tables and figures can be confusing and irrelevant. In general, use tables and figures to concisely *summarise* information that would be difficult to describe in words alone. Text alone should not be used to convey more than three to four numbers or variables - sets of numerical data should be presented in a table or figure. Also, tables should be used when readers need fine-grain detail on numbers. Tables are generally better than graphs for giving structured, numeric information, whereas graphs are better for indicating trends and making broad comparisons, or relationships.

For any piece of scientific writing, there will often be two types of readers: those who scan through the text, ignoring most of the tables and figures and those who scan through the tables and figures and ignore most of the text. A well-written report will accommodate both sets of readers. Tables and figures should be used to document information that cannot adequately be described in the text. However, it is important to note that poorly presented tables and figures can be confusing and irrelevant.

Both tables and figures should be self-explanatory. A reader should be able to understand them without referring to the text. The text should always mention key points in a table or figure - if it does not warrant discussion, it shouldn't be there!

1. Tables

The following are general rules to consider when constructing tables. Note that these are *general* rules and are not cut in stone[2].

Titles and Numbering
- The title should be simple and clear – it must be able to stand alone
- The title should be placed above the table – use either capital Roman numerals (Table IV) or Arabic (Table 4).
- Tables are numbered in consecutive order as they are referred to in the text.
- Use a consistent numbering style for all tables.

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[2] http://www.physics.uiuc.edu/Education/398IRP/Tables/

- The initial letters of each word in the title should be capitalised.

Headings in Tables
• Each column in a table must have a clear and concise heading that identifies the data.
• The initial letters of each word in the heading should be capitalised.
• The heading should contain the units of measurement (where necessary) which are placed in parentheses below the column heading.
• Units of measurement alone are not sufficient for a heading.

Borders
• Horizontal line should be placed at the top (under the title), under the column headings and under the main body of the data
• Vertical lines are not used in simple tables, but may be used to mark off minor subdivisions in complex tables
• Omit vertical lines at both right and left margins
• In long tables, separate every 5th row of figures with a double space

For example:

Table I
Pre- and Post-training Reliability for Velocity and Accuracy of Throwing

	Pre-training		Post-training	
Source	Velocity	Accuracy	Velocity	Accuracy
Day 1 vs 2	0.98	0.23	0.94	0.65
Day 2 vs 3	0.94	0.54	0.93	0.69
Day 3 vs 4	0.92	0.24	0.92	0.55

Footnotes
• Use superscripted letters ([a, b, c]) to number footnotes in a table, beginning again with [a] for subsequent tables.
• Footnotes are ordered from left to right across the top row, then from left to right across the second row etc.
• Footnotes themselves are placed outside and just beneath their respective table, not at the bottom of the text page.
• Non-standard abbreviations or symbols used in tables must be defined in footnotes.

Rules for Constructing Tables
• A table should contain at least three columns
• Emphasise only one significant fact per table
• Represent results as simply and concisely as possible – avoid crowded tables. If too crowded, try to divide it into more than one table
• Construct the table so it reads from left to right
• Make comparisons within columns rather than rows.
• IV (treatment - one you have no control over) should define the rows of the table and the DV (measurable variable) the columns – it is easier for a reader to make comparisons within columns rather than rows. Like elements should therefore read down rather than across.
• 1st column on the left is the "anchor" or most important column
• Arrange tabulations so that columns are spaced for ease of reading

- Do not leave any blank cells – indicate no data by 3 raised ellipsis (⋯)
- Use *SI* units of measure
- Align values by decimal points or by right hand digit, if no decimal point.

General Table Conventions
- Report the most meaningful data only
- When reporting time, sort them from left to right in columns, from oldest to most recent in rows.
- If the table is wider than it is long, it may be placed broadside on the page (landscape).
- Borders: thin lines under the title and heading cells and under the main body of the data. No vertical lines.
- Don't "dress up" your report by presenting data in the form of tables or figures that could easily be replaced by a sentence or two of text.
- Don't include columns of data that include the same value throughout. If the value is important to the table, include it as a footnote.

2. Figures: Graphs / Charts / Drawings

Sometimes data can be presented in a more meaningful way by a well-designed figure / graph than by a verbal description. Graphs convey information to the reader quickly and provide a visual display of data that would otherwise be presented in a table or the text. A graph should convey ideas about the data to the reader that would not be as readily apparent if they were in a table, e.g. outliers.

Good Practice for Graphs
- Ensure the purpose of the figure is readily discernible by visual inspection.
- Stress one significant point per graph
- Choose the right type of graph or each kind of data.
- Arrange one figure per page, centred on the page, immediately following the page on which it was mentioned in the text.
- Avoid graph junk such as 3D effects, excessive grid lines, redundant labels etc. Minimise the ink-to-data ratio!

Rules for Titles and Legends
- Provide a Figure number (Arabic - Figure 1) and a clear and concise title *below* the figure (Tables are placed *above*).
- Avoid all abbreviations, except units of measurement.
- Number figures consecutively and always refer to them in the text:
- Make sure each axis is labelled, including units in brackets.
- Provide clear keys / legends for all variables. Place the legend below the figure.

Rules for Constructing Graphs
- Independent variable, especially time, should be allocated to the X axis (horizontal)
- Dependent variable should be placed on the Y axis (vertical)
- Graph proportions: height (Y axis length) = ¾ width (X axis length)
- Arrange the graph so that it can be read from left to right
- No more than 3-4 lines per graph (6-7 bars), too confusing
- Make sure readers can clearly distinguish the lines for separate variables, especially if they all intersect each other at the same spot. Mix solid, dotted, dashed lines etc. for clarity.
- Use solid, dotted and dashed lines or different symbols to distinguish variables, rather than

colour. Same for bar charts, use different black and white patterns.
- Make sure the axes don't extend beyond the data points.
- Use tic marks between numerical intervals on the axes to reduce crowding.
- Ensure a proportionate scale on Y axis. Don't distort data.
- Avoid scale distortion when two variables with numbers of differing magnitudes are graphed on the same chart, the variable with the large scale will generally appear to have the greater degree of variation. The smaller scale variable will appear "flat", even though the percent change may be the same. The example below illustrates this - data series ◊ appears to have more variation than ■ and shows a greater improvement. On closer inspection, it can be seen that they are identical, varying only by a factor of ten. To overcome this, use 2 axes i.e. Y and Y', but this often makes interpretation of graph more complicated!
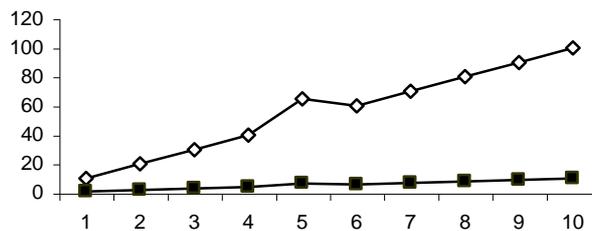
For example:
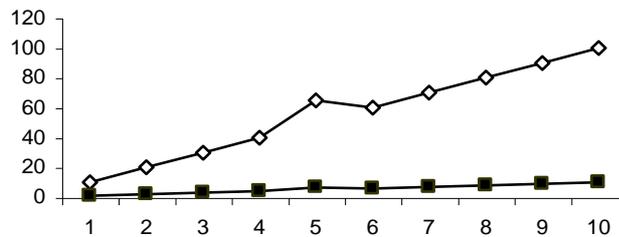
Data series ◊ :	10	20	30	40	65	60	70	80	90	100
Data series ■ :	1	2	3	4	6.5	6	7	8	9	10

Different types of graphs

Line graphs can be used for continuous variables, e.g. growth, temperature etc. They display lots of data in a little space and depict relationships between more than one variable, that can't easily be discerned when the data are presented in tabular form.
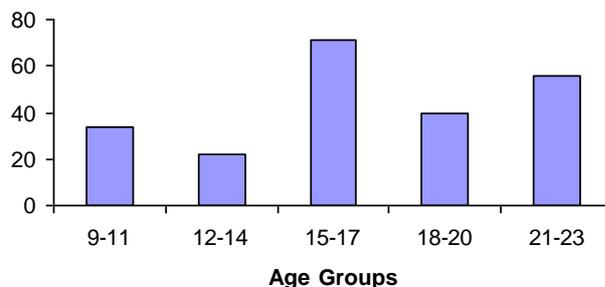

Scatter plots show the relationship between two variables and aids in the interpretation of correlation coefficients.
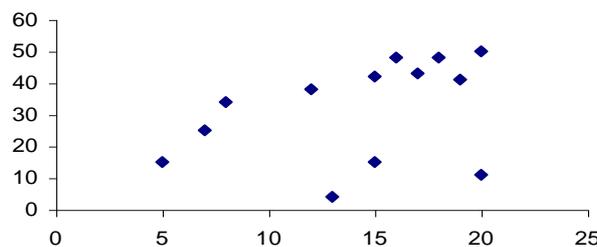

Bar charts are used to compare discrete variables (i.e. those that only take on whole numbers, e.g. soccer score, number of people etc.). They summarise categorical data, each bar representing a

different category, e.g. age group, fertiliser type etc.

Stacked bar graphs (especially if 3D effects are used) are difficult to read and should be avoided. It is often difficult to estimate the value of the variable represented on top of the bar.
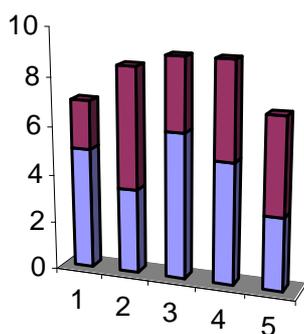
Histograms are a type of bar graph that compare categorical data that is arranged in classes or groups. They are used to indicate frequencies. A histogram is a bar chart in which the bars are placed next to each other, rather than being separated. Histograms, like bar graphs, are good at detecting unusual observations (outliers) or gaps in the data set.

Pie Charts summarise categorical data in the form of percentages, such as distributions within a population. The pie is a circle that is divided into segments, each representing a particular category. The area of the segment is proportional to the number of cases in that category.

Pie charts are fun to look at but generally involve a great deal of ink to display very little data. It is often difficult to discern the exact magnitude of the pie slices. This is all made worse by using 3D effects and "exploding" pies.
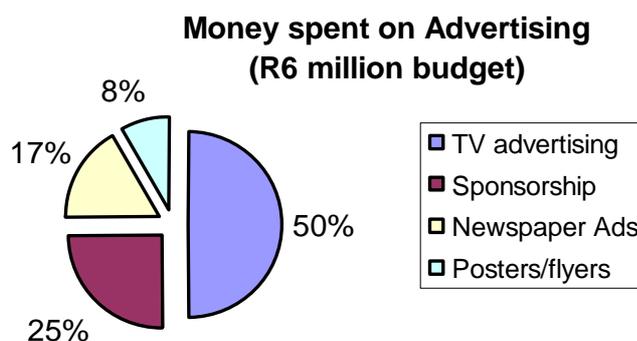
3. Reporting on data in the text

When reporting data in the text, do not repeat the contents of a table or figure, simply highlight the important features. In general, a single table should be accompanied by about half a page of double spaced text, directly related to the content of the table. In the textual discussion, refer to the table or figure by number, e.g. Table II depicts the relationship between… or …it can be seen that there is a significant relationship between the two variables (Figure 2).

The table or figure itself should appear as soon as possible *after* it has been mentioned in the text. Generally tables and figures are placed on a page of their own, in the centre of a page, immediately following the page on which they were first mentioned. If you do insert tables and figures directly into the text, i.e. not on a page of their own, try not to break a paragraph with a table or figure.

When stating the level of significance, enter ($p < .05$) after the statement, e.g. there was a significant difference ($p < .05$) between… Try to avoid any disruption of the flow of text when statistical significance is referred to in the text. If there are a large number of significant differences to report, you can make a general statement about the level of significance at the beginning of the Results section, e.g. all treatment differences referred to in the results are statistically significant at the 5% level, unless otherwise stated.

When reporting Statistics in the text, always present the **mean**, number of observations and the measure of variability of observations (range, standard deviation, standard error of the mean etc.). The **standard deviation** can also be presented as an appendage to the mean, e.g. the sample as a whole was relatively young ($M = 19.2$, $SD = 3.45$); or the initial weights of the subjects ($n = 48$) in the study had a mean of 64.7 kg and ranged from 59.2 to 68.6 kg. Traditionally, the standard deviation and/or the standard error of the mean are presented with one or more decimal places than the mean, e.g. the average age of the students was 19.2 ± 3.41 years. **Percentages** are also most clearly displayed in parentheses with no decimal places.

In terms of inferential statistics (ANOVA, MANOVA etc.), the statistical analyses are not normally included in a thesis. They are primarily to help the researcher understand the data. In tables, you generally only see the actual F values from an ANOVA and the probability level from t-tests. Normally, the only numbers to present in a table are the treatment means, a measure of their precision (standard deviation or standard error of the mean) and the significant probabilities of the various factors and interactions. It should be pointed out at this stage that the following suggestions are only one of the acceptable ways to report statistics in the text and should be used purely as a guideline.

When reporting **t-tests** in the text, the degrees of freedom are placed in parentheses and subscripted, followed by the t statistic (rounded to 2 decimal places) and the significance level, e.g. there was a significant effect for gender, $t_{(54)} = 5.43$, $p < .01$, with men receiving higher scores than women. **ANOVAs** are reported like the t test, but there are two degrees of freedom numbers to report. First report the between-groups degrees of freedom, then the within-groups degrees of freedom (separated by a comma). After that, report the F statistic (rounded to 2 decimal places) and the significance level, separated by a comma. For example: There was a significant treatment main effect, $F_{(1,145)} = 5.43$, $p < .01$, and a significant interaction, $F_{(2, 145)} = 3.13$, $p < .05$.

Regression is often best presented in a table. Present the standardised slope (beta) along with the significance level in the text, e.g. the linear regression analysis showed that increasing the amount of phosphorous applied by 1 kg/ha increased dry matter yield by 32.1 kg/ha ($SE = 8.9$). The correlation coefficient was 0.74.

Chi-Squared statistics are reported with degrees of freedom and sample size in parentheses, the Pearson chi-squared value (rounded to 2 decimal places), followed by the significance level.

Chi-square tests the significance of the discrepancy between the observed and expected results, hence N is the population size. For example: The percentage of participants that were married did not differ by gender, χ^2 (1, N=90) = 0.29, p < .05.

Discussion

The main job of the Discussion is to interpret your results. Interpretation, in this case, means looking at those results within a larger context, which you have established in the Introduction. The most important aspect of that context is the hypothesis, which is why the Discussion starts there. Follow the **Five Steps** outlined below:

Step 1. State the relationship between the hypothesis and the results.
>   In trying to make sense of the data for yourself, you need to figure out what the relationship is between the data and your initial hypothesis:
>   - the data fully support the hypothesis,
>   - the data do not support the hypothesis, or
>   - the data support the hypothesis with certain qualifications.
>
>   Go back to your Introduction and your initial judgment and see if you can still stand by it. If not, rewrite it accordingly. In either case, revise it as necessary to act as suitable first sentence of the Discussion.

Step 2. Give a detailed explanation of the relationship you have found between the hypothesis and the results.
>   The support or non-support of the hypothesis by the results naturally raises the question of why. Whatever the relationship between the hypothesis and the results, you must explain the scientific basis for it.
>
>   Return to the scientific reasoning you used to generate your hypothesis (at the end of the Introduction). Your explanation is likely to follow one of the following **four scenarios**:
>
>   1. If the results fully support your hypothesis and your reasoning was basically sound, then elaborate on your reasoning by showing how the science behind the experiment provides an explanation for the results.
>
>   2.If the results fully support your hypothesis but your reasoning was not completely sound, then explain why the initial reasoning was not correct and provide the better reasoning.
>
>   3. If the results generally support the hypothesis but with qualifications, then describe those qualifications and use your reasoning as a basis for discussing why the qualifications are necessary.
>
>   4. If the results do not support your hypothesis, then explain why not; consider
>   - problems with your understanding of the lab's scientific concept;
>   - problems with your reasoning, and/or
>   - problems with the laboratory procedure itself (if there are problems of reliability with the lab data or if you made any changes in the lab procedure, discuss these in detail, showing specifically how they could have affected the results and how the errors could have been eliminated).

Step 3. Describe how your results compare with the results of related scientific experiments

and explain what that comparison reveals.

The other major item (besides your hypothesis) to use as a source of comparison for your results is the experiments of other scientists. You were asked to do some background research in the scientific literature and summarized articles in your Introduction and Literature Review. Address these other articles in the Discussion. You may also want to compare your findings with those of other students in your lab. Either way, be sure to properly cite other findings.

- Do your results generally fit in with the results of other similar experiments? Why or why not?
- How do your findings fit in with the accepted knowledge in this area?
- How do the procedures you used fit in with procedures used by other scientists (or students)?

Step 4. Consider other issues that may be pertinent to the Discussion.

- What is significant about the results in terms of the overall scientific concept that is the basis of the lab as presented in the Introduction?
- What suggestions do you have for improving the lab?

Step 5. Compose the Discussion using the elements you've created.

- Since the hypothesis plays such an important role in scientific thinking, it's generally a good idea to begin with the comparison between the hypothesis and the data and the explanation for the comparison.
- Then you may move to the comparison between your findings and the findings of others (if that is appropriate to your report).
- Be sure to explain the comparisons you identify.
- Then include any other material that you think is pertinent.
- Arrange this material in paragraphs, each paragraph focused on a main idea.

More Discussion Tips

- The Discussion section is not the place to introduce any new findings. Do not discuss any findings not presented in the Results.
- The Discussion section is also not generally the place for detailed analysis of graphs, tables, and drawings presented in the Results. Rather, focus on the broader findings from the Results.
- Use the past tense when referring to what has been done in the experiment, but use present tense when talking about most everything else, such as scientific concepts, explanations, and references to articles.

Conclusion

The conclusion section is where interpretations are made and conclusions drawn about whether the results support or fail to support the hypothesis. In some cases the Discussion and Conclusion section are written as one chapter. (It is best to consult with your supervisor about your thesis chapter content and structure.)

Consider the following when writing this section:

- Again, **state the strongest**, most convincing data of your argument in support or rejection of the hypothesis first, followed by progressive weaker arguments.
- Include comments on how experimental errors might have affected your results and what could be done to reduce them.
- If there has been similar research done by others, state how your work compares.

- State the relevance of the experiment to the field of research and where new directions of research might lead from this experiment.

_____

PART 5 – PLAGIARISM AND CITATION
Karin de Jager and Nelleke Bak

Plagiarism in academic writing

Students are often unsure of exactly what plagiarism is and how it affects them. Cutting and pasting from electronic resources has in recent years made it extremely easy to "lift" text and to present it as your own. Be aware that this is not acceptable academic practice under any circumstances and that there are sophisticated Web sites and techniques specifically aimed at tracking down this kind of plagiarism. Ignorance or carelessness is no excuse for plagiarism. Plagiarism essentially is the stealing of others' words, thoughts and ideas and is treated like fraud. Accusation of plagiarism is therefore a serious charge and will be dealt with very severely.

Students who are relatively new to the rigours of academic work are often unsure of exactly what plagiarism implies. In the first place, English may not be your first language and you may find it very difficult to reproduce complex ideas, which you might not even understand very well, in your own words. And the academic discourse is itself a different language with foreign conventions that you are somehow meant to imbibe while at university, but which is very seldom spelled out clearly. The following list has therefore been compiled to help you understand a little more of the implications of academic writing and how you can begin to safeguard yourself from any accusations of plagiarism.

Things that students don't necessarily know automatically and are not always taught explicitly:
- Academic writing requires that no claim should be made without being backed up - either by an argument, or by stating that you have found something empirically, or by citing a source. (Details of citation will be discussed below.)

- You might not always understand when something may be regarded as common knowledge and therefore does not need to be referenced. The statement that "Dogs come in different breeds, sizes and colours" does not need a reference to the Encyclopaedia Britannica. If you are in doubt about whether something may be common knowledge or not, then *say* that it is 'generally understood' or 'may be regarded as common knowledge'.

- Some students express irritation at the constraints of referencing and claim for example that one cannot reference something that was read a year ago, but still wish to make use of vaguely remembered facts or statements in their written work. This is not acceptable academic practice; if you wish to mention a particular story or statement or fact, you have to find a reference source that backs it up. (The Internet is most helpful here!)

- You might believe that it is sufficient to read a single review article and then cite other writers taken from there as if these sources were read as well. Many references in your text to authors that have been quoted by other authors significantly detract from your work. You should as far a possible go back to the original papers and not just cite the review article as the source. It is even worse to copy the references from the review article as if you have read the original; this is patently dishonest.

- It is important to understand that citation enhances your writing and is not designed just to stifle your originality and imagination! The academic discourse depends on the foundation of your work on the work of other scholars before you.

- Sophisticated academic writing integrates a number of viewpoints and texts with discussion by the author. Especially at post-graduate level, you are encouraged to develop your "own voice", but remember, it must be an **informed** voice! This is not an easy skill to learn. It is not acceptable to merely paste together one quotation or paraphrase after the other in order to let cited sources

talk to one another as it were. Lecturers do not only want to read what others have said on a topic, but essentially want to know how well you have understood a topic and whether you are able to formulate your *own informed* ideas as a result of your engagement with the literature. One way of preventing this kind of stringing together of sources in your own written work, is to remember that whenever you quote or cite someone, you have to discuss or comment on that writer's words after the citation, or give some example from your own experience illustrating the statement, before you quote someone else.

- The importance of peer reviewed sources is not always understood. Peer review consists of a rigorous process of anonymous review of all papers that are offered for publication in academic journals. It is a lengthy, time consuming process which (even though not entirely immune to abuse) ensures accountability and reliability in the transfer of knowledge. Peer review produces articles that are essentially different from those in newspapers and journals like *Newsweek, Cape Times*, or *New Scientist.* While the journalistic press may or may not take reasonable measures to produce facts accurately, the constraints of time and the pressures of readability or popularity may seriously affect veracity.

- You should always keep in mind that resources from the Internet and the Worldwide Web should be used with caution. Materials on the Web are generally *not* peer reviewed. There is some *very* good stuff available on the Web, but you should remember that anybody can mount anything on the Web and the responsibility is yours to make sure is comes from a reliable source. Web resources are still poorly archived and sites move or disappear all the time. This may affect the quality of your written work. If resources are not verified properly, or if web addresses are not properly recorded, or if they can no longer be found, sources cannot be checked and that detracts from your work.

Very helpful additional information on plagiarism in academic writing can be found at:
http://www.lib.uct.ac.za/infolit/report.htm

Good reasons for academic referencing

The discussion above has emphasized that all academic writing requires you to reference all the sources that you have read and consulted in the preparation of your work. Referencing, also know as citation, consists of quoting from other writers' words and thoughts and the listing of their names, together with the titles and other details of their publications so that these can be tracked down independently. Citation is an important aspect of academic writing of all kinds. There are good reasons for this:

- Citations tell the reader of your text that you understand the topic and have read about it. You give authority to your statements and add value to your writing by showing that other writers have supported your arguments.
- Citations show how well you know the field. It is important to show that you know who the important writers are in a specific field and if you leave some of them out, or if you use the writings of those who are less highly regarded or who have been discredited, it may detract from your own work.
- Citations show how up-to-date your reading has been. In certain subject fields it is very important to be aware of the most recent developments.
- Writing is "intellectual property" and you have to give credit to persons who first expressed an idea.
- Citations enable the *reader* of your work to check the accuracy of a quotation, or to find the source and the context of a quotation.
- Citations are most important in protecting you from being accused of plagiarism.

How do I cite correctly and avoid plagiarism?

- Every single instance when you use extensive phrases and substantive ideas that are not your own, you must acknowledge the source from which you haven't taken them.
- When you quote someone's words directly, you *have to place these words <u>in</u> quotation marks.*
- In the case of quotes longer than three lines, block and indent them in order for them to stand out more clearly. You may reduce the font and/or the line spacing if you wish. Don't use inverted commas. Use blocked quotes sparingly.
- If you express another's words or ideas by *paraphrasing* them, you have to use your own words. (Use your word processor's "thesaurus" feature to help you find different words for the same concept.) It is *not enough* simply to change the word order or to substitute one or two words only.
- You may also *summarize* more lengthy material in your *own* style and word choice. If you repeat the author's own phrases / sentences place them in quotation marks. (For example: According to Bell (2002), businesses using customer information for marketing purposes puts them in a "morally ambivalent" position.)
- When you use your own words to express the ideas of someone else, you must still quote the source, even though you then do not have to use quotation marks.
- It is important to keep a list of all the references you use as you go along, rather than trying to list the whole lot at the last minute. You are then bound to lose track of some of the things you have read.

Citation styles

There are a number of different styles and conventions which are widely used. Well-known style manuals include the *Chicago Manual of Style,* and those published by the American Psychological Association (APA), the Modern Language Association of America (MLA) and The (British) Modern Humanities Research Association (MHRA). One of the best-known, but also one of the simplest, is the "author-date" style for citations and reference lists (sometimes known as the "Harvard method"). Scientific publications often use the citation or style guides published by societies and institutions in their own disciplines. In all cases, *consistency* in presentation is the most important consideration.

For theses and dissertations it is essential to make sure of the specific details of the citation convention required by your department and then to pay particular attention to capitalization and the use of italics (or underlining) and to check punctuation very carefully. External examiners usually pay particular attention to citations and references. The requirements of different citation styles with exhaustive examples are given in the following website:

http://www.lib.uct.ac.za/infolit/bibl.htm

(See also Appendix A)

It is essential to remember that all full bibliographic references, regardless of style, essentially have to convey the same kind of information and consist of the same elements, although the basic order may differ slightly according to different conventions. The purpose of all citations essentially is to provide sufficient information for an item to be found. All citations should therefore contain, in the order prescribed by the citation style, the following elements:

- **Name** of the author(s) or originator(s) of the document you are using as a source.
- **Date** of publication
- **Title** of the publication (and, if it is part of a larger work, e.g. an article in a journal, or one

paper in an edited collection, also the title of the whole publication)
- **Publication details** (Place of publication & Publisher if the item is a book; Volume and/or issue number if the item is a journal)
- Inclusive **page numbers** if the reference is to an item smaller than a whole book.

Citing sources within the text

The ***author-date*** citation method is very well-known and well established in the social sciences and is increasingly used in literary studies as well (Visser, 1992:78). To show that you have borrowed words or ideas from elsewhere, you have to indicate this in your text, to the reader. Use the "reference indicator" which contains brief publication details in round brackets. It may appear in either of two ways within your text:

1. When the name(s) of the quoted author(s) form part of a sentence, the reference indicator consists of the date and the page on which that quotation appears. For example:
   In her analysis of reading comprehension among primary and secondary school pupils, Pretorius (2000:33) proposes that inadequate reading skills play a significant role in the poor academic performance of many South African scholars.

2. Where the sentence does not specifically state the original author's name, the reference indicator has to include the surname(s) of the author(s), followed by the date and the page on which the specific quotation appears. For example:
   In an analysis of reading comprehension among primary and secondary school pupils, it was found that inadequate reading skills play a significant role in the poor academic performance of many South African scholars (Pretorius, 2000:33).

List of references at the end of the text

Whereas in your text you use only the reference indicator (makes for more fluent reading), in your bibliography at the end of your thesis or assignment you must give full details of all the quoted sources in your text. This enables your reader to find the original source. Here is the full reference for the example above:
   Pretorius, E.J. 2000. What they can't read will hurt them: reading and academic achievement. *Innovation* 21: 33-41.
Note that the page reference now indicates the length of the entire paper and not just the page on which the quotation appeared

This list at the end of your text may be called *"References"* or *"Bibliography"*. A list of *"References"* includes only those works (reference indicators) you have noted in your text. A *"Bibliography"* lists all the works you have consulted for your writing, both those noted in your text as well as those that have informed your thinking about the topic you've written on, but which you have not referred to directly in your text.

The list of references is arranged alphabetically by surname of the author. Alphabetical order enables a reader to locate details of all the sources cited quickly and efficiently. If a work has no identifiable author or organization, the alphabetic arrangement is by the name of the editor(s) or by the first main word of the title.

If you are using an author or organization who has more than one source published in the same year,

you need to distinguish for your reader exactly which one you're referring to. Do this by adding an "a", "b" etc directly after the year. Use this distinction in both your text reference indicator as well as in the reference list at the end. Examples of two publications by the same author(s)/ organization in a single year:

> Department of Labour, 2000a. *Framework for general training*. Government Printers: Pretoria.
>
> Department of Labour, 2000b. *Technology 2005: Discussion document*. Government Printers: Pretoria.

or

> Bauer, P.J. & Wewerka, S.S. 1995a. Effects of experience and reminding on long-term recall in infancy: remembering not to forget. *Journal of experimental child psychology*. 59:260-298.
>
> Bauer, P.J. & Wewerka, S.S. 1995b. One- to two-year olds' recall of events: the more expressed, the more impressed. *Journal of experimental child psychology*. 59: 475-496.

1. Citing Books

Things to remember in citing books:

- The names of authors are shown with surname first. Forenames may be abbreviated to the initials only, but be consistent. Sometimes, an *organization* may function as the author.

- If there is more than one author, list them in the order given on the title page, separating them with the use of commas and the ampersand (&) sign. Alphabetic order will be according to the surname of the first author.

- An editor may be treated like an author, but attach the abbreviation "Ed." to the name, as the function of an editor is different from that of an author.

- If there is no identifiable author or editor, the first part of the entry is the title of the work and alphabetic order will be according to the first word in the title that isn't "A", "An" or "The". (E.g. The Cape Times)

- It is a convention that the *titles* of all *published* materials are listed using *italic* type or by underlining. If your word processing package and printer can display italic type you may use either *italics* or underlining, but not both.

- The edition should be mentioned unless it is the first edition. When there is no edition statement, you may assume that the work is a first edition.

Examples of references to books:
Examples of how to cite:

A book by a single author:
Bloom, A. 1987. *The closing of the American mind: how higher education has failed democracy and impoverished the souls of today's students.* New York: Simon and Schuster.

A book with more than one author:
Behrens, S.J., Olën, S.I. & Machet, M.P. 1999. *Mastering information skills.* Pretoria: Unisa.

A book produced by an editor rather than an author:
Stone, R.L. Ed. 1989. *Essays on The closing of the American mind.* Chicago: Review Press.

An edition of a book other than the first:

Visser, N. 1992. *Handbook for writers of essays and theses*. 2nd ed. Cape Town: Maskew Miller Longman.

A section or a chapter in a book:
Burns, T. 1984. Mechanistic and organismic structures. In *Organization theory: selected readings*. 2nd ed. edited by D. S. Pugh. Harmondsworth, Middlesex: Penguin. 40-51.

Green, K. 1996. The use of auditory and visual information in phonetic perception. In *Speechreading by humans and machines,* D. Stork and M. Hennecke, Eds. Berlin, Germany: Springer. 55-77.

A paper from a conference publication:
Poll, R. 1998. The house that Jack built: the consequences of measuring. *Proceedings of the 2nd Northumbria International Conference on Performance Measurement in Library & Information Services.* 7-11 September 1997, Longhirst Hall, Northumberland. 39-45.

2. Citing journal articles

Things to remember in citing a journal article:
- Articles are listed according to the surname of the first author that appears on the article. If there are more than three authors, you may give the name of the first author only, followed by "…[et al.]" which means "and others".
- The title of the *journal* is italicized (or may be underlined).
- Volume and issue numbers of the journal are given, followed by the page number (or starting and ending pages if it covers more than one page) of the complete article. Some journals have volume or issue numbers only and not both (see the first and third examples below).
- By indicating the volume numbering in the fixed sequence: Volume(issue number):starting page(-end page) it is not necessary to use the abbreviations *vol.; no. pp.* or *p.* to indicate volume, issue and page numbers. See the examples below that follow:

Examples of references to journals:
Kiondo, E. 1999. Access to gender and development information by rural women in Tanzania. *Innovation.* 19:18-27.

Levitt, A.G. & Wang, Q. 1991. Evidence for language-specific rhythmic influences in the reduplicative babbling of French and English learning infants. *Language and speech.* 34(3): 235-249.

Lillard, A. 1998. Wanting to be it: children's understanding of intentions underlying pretense. *Child development.* 69:981-993.

3. Citing a thesis or an unpublished discussion

Things to remember in citing an unpublished source:
- The titles of unpublished works are not underlined or italicised.

Examples of references to unpublished sources
Makhubela, P.M. 1998. Public libraries in the provision of adult basic education programmes: the case of the Western Cape Province, South Africa. D.Bibl. Thesis. Department of Library and Information Science, University of the Western Cape.

Thapisa, A.1998. Co-operation with the University of Botswana. [Personal interview, 10 March]. Cape Town. (Unpublished).

4. Citing electronic sources

Things to remember in citing electronic sources:
- Citation conventions for electronic sources are sometimes regarded as problematic, but citations for electronic sources are essentially no different from any other citations: the reader wants clear instructions about *how* and *where* to find an item. Frequently, data held electronically may be moved to different locations, so that hyperlinks become obsolete and documents sometimes disappear entirely. It also becomes necessary, therefore, to show the *date* of consultation when referring to such sources, to indicate how recently a link was still functioning.

- Electronic information might be found in electronic mail services, such as listservers for specific interest groups, or published on CD-Rom discs or in electronic databases and the Worldwide Web. Information published electronically may have counterparts that are also published on paper. Where electronic sources also exist in traditional print form, it is advisable to note in your references the details about the print as well as the electronic sources, as web sources are not yet archived very well and web addresses may change.

Any citation to an electronic source should conform to your chosen citation style and should contain:
- an **author** if you are able to establish one
- the **date** on which the document was produced or updated
- the **title** of the electronic document
- the **medium**, which may be "Online" or "CD-Rom" in square brackets, or you may use "Electronic" if you are not sure whether the source is online or networked CD-Rom
- the **uniform resource locator** (URL) which may sometimes be given between angle brackets (< >). If the URL is very long, it may be written on two lines, but try to break a line only where a punctuation mark occurs and do not *add* a hyphen, as this will alter the URL.
- the **date** on which the document was last accessed, often in square brackets.

Examples of how to cite:

An electronic journal:
Aird, A. 2001. E-commerce in higher education: can we afford to do nothing? *Ariadne*. 26. [Online]. Available: http://ariadne.ac.uk/issue26/e-commerce/intro.htm [2001, March 8].

Smith, A.G. 1997. Testing the surf: criteria for evaluating Internet information resources. *The public-access computer systems review* 8(3). [Online]. Available: http://info.lib.uh.edu/pr/v8/n3/smit8n3.html [2002, September 12].

A journal article available in both electronic and print formats:
Brink, P.J. 2001. Violence on TV and aggression in children. *Western journal of nursing research*. 23(1):5-7. [Electronic]. Available: EBSCOHost: Academic Search Premier. [2002, September 11].

Articles from the World Wide Web:
Standler, R.B. 2000. *Plagiarism in colleges in the USA*. [Online]. Available: http://www.rbs2.com/plag.htm [2002, September 11].

Walker, J. 1997. *Intellectual property in the information age: a classroom guide to copyright.* [Online]. Available: http://www.cas.usf.edu/english/walker/papers/copyright/ipdummie.html [2002, September 11].

APPENDIX A - RESOURCES

BOOKS

Day, R. A. 1983. *How to write and publish a scientific paper.* 2nd ed. Philadelphia: ISI Press.

Day, R.A. 1992. *Scientific English: a guide for scientists and other professionals.* Phoenix, AZ: Oryx Press.

Delamont, S. 1992. *Fieldwork in educational settings.* London: Falmer.

Gopen, G..D. & Swan, J.A. 1990. The science of scientific writing. *American scientist.* 78:550-558.

Matthews, J.R., Bowen, J..M. & Matthews, R.W. 2000. *Successful scientific writing.* Cambridge: Cambridge University Press.

Mauch, J.E. & Birch, J. W. 1993. *Guide to the successful thesis and dissertation: a handbook for students and faculty.* 3rd ed. New York: Marcel Dekker.

Mouton, J. 2001. *How to succeed in your Master's and Doctoral studies*, Pretoria: Van Schaik.

Phillips, E.M. and Pugh, D.S. 1994. *How to get a PhD.* 2nd ed. Buckingham: Open University Press

Reinking, J., Hart, A., & Von Der Osten, R. 1996. *Strategies for successful writing.* 4th ed. New Jersey: Prentice Hall.

Turabian, K. 1996. *A manual for writers of research papers, theses and dissertations*. 6th ed. Revised by Grossman, J. & Bennet, A. Chicago: University of Chicago Press.

Visser, N. 1992. *Handbook for writers of essays and theses*. 2nd ed. Cape Town: Maskew Miller Longman

ONLINE

Research ethics information
http://anes.hmc.psu.edu/ArenaFolder/ArenaHome.html

http://reserach.ou.edu/policy/ethics.htm

http://infoserve.unisa.edu.au/adminfo/policies/research/res02.html

http://www.health.gov.au/nhmr/research/contents.htm

http://books.nap.edu/catalog/4917.html

http://www.indiana.edu/~poynter/index.html

Overview of Scientific Writing
http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWgeneral.html

http://www.qub.ac.uk/bb/jbpage/honours/tutees.htm

Resources

http://www.medbioworld.com/home/lists/sciencewriting.html

http://www.reed.edu/~mgeselbr/chem212/writing.html

http://www.acs.org/portal/chemistry?PID=acsdisplay.html&DOC=library%5Csciwriting.html

http://owl.english.perdue.edu/

Writing Guides

http://www.pubs.asce.org/authors/index.html (ASCE Authors' Guide. 2000)

http://www.fas.harvard.edu/~wricntr/wtools.html (Writing Tools, Harvard Univ.)

http://web.mit.edu/uaa/www/writing/links/ (Online Technical Writing Textbook by D.A. McMurrey)

http://owl.english.perdue.edu/ (Online Writing Lab [OWL], Perdue University)

http://www.wisc.edu/writing/handbook/academicwriting.html (Writer's Handbook, University of Wisconsin)

http://writing.colostate.edu/references/processes/science/ (Writing Guide, Colorado State University)

Writing Styles

http://www.uwinnipeg.ca/~clark/research/comm.html (APA guidelines)

http://www.csad.coventry.ac.uk/IDN/neopraxis/harvard.html (Harvard Style)

Assessing the Audience

http://www.me.vt.edu/writing/

Basic Structure - *Sentences*

http://www.ihes.com/sresource/sstudy/simplesentence.html

http://owl.english.perdue.edu/handouts/general/gl_sentvar.html

http://www.dartmouth.edu/~compose/student/ac_paper/style.html

- Paragraphs

http://www.dartmouth.edu/~compose/student/ac_paper/write.html

http://webster.commnet.edu/grammar/paragraphs.htm

- Thesis

http://www.dartmouth.edu/~compose/student/ac_paper/what.html#structure

http://www.cc.gatech.edu/fac/spencer.rugaber/txt/thesis.html

Grammar

http://www.dartmouth.edu/~compose/student/ac_paper/grammar.html

Word Usage

http://www.ag.iastate.edu/aginfo/checklist.html

Jargon
http://www.lockley.net/avoid_jargon.shtml

Nuts and Bolts of Writing (punctuation, abbreviations, numbers etc.)
http://sportsci.org/jour/9901/wghstyle.html

Reasoning
http://www.richmond.edu/~writing/wweb/reason.htm

Working with Sources
http://www.lehigh.edu/~incent/writing/quotes/sourcegate.htm

http://www.wise.edu/writing/handbook/quosampleparaphrase.html

Plagiarism
http://www.lib.pku.edu.ca/webcourse/advanced_english/plagiarism.htm

http://www.apurnell.com/cs1readings/sumparquote.htm

http://lisweb.curtin.edu.au/guides/handouts/ (The pages above contain good guides to citation and referencing with many examples. Curtin. Office of Teaching and Learning. *Information sheets*)

http://condor.bcm.tmc.edu:80/Micro-Immuno/courses/igr/homeric.html

Footnotes

http://www.lehigh.edu/~inhelp/footnote/ (Footnote and citation style guides)

Logical Fallacies in Scientific Writing
http://mason.gmu.edu/~arichar6/logic.htm

Proper use of Tables
http://physics.uiuc.edu/education/398IPR/tables/

http://www.rdg.ac.uk/ssc/dfid/booklets/toptgs.html

http://www.acp.edu/web/genchem/GCI/lecture/supplem/writing/table.htm

http://lilt.ilstu.edu/gmklass/pos138/datadisplay/goodtables.htm

Proper use of Figures
http://lilt.ilstu.edu/gmklass/pos138/datadisplay/badchart.htm

http://lilt.ilstu.edu/gmklass/pos138/datadisplay/goodcharts.htm

http://faculty.uca.edu/~march/biol/sciwriting/figures.htm

http://lilt.ilstu.edu/gmklass/pos138/datadisplay/tipsFORexcel.htm (Tips on using MS Excel to prepare graphs)

General search engines
Of course, http://www.google.com is one of the best known and extensive search engines.

Others: AltaVista http://www.altavista.com

            Lycos http://www.lycos.com

            Northern Light http://www.northernlight.com

Internet Journal Site Guide: http://www.library.ubc.ca/ejour/abc.html

Virtual library: Bulletin Board for Libraries (BUBL); http://bubl.ac.uk/link/

Subject Based Information Gateways (SBIGS)

Master site for SBIGs: PINAKES: http://www.hw.ac.uk/libWWW/irn/pinakes/pinakes

Resource Discover Network: http://www.rdn.ac.uk/

Social Sciences Information Gateway: http://sosig.ac.uk/

Humanities and social sciences: http://www.nrf.ac.za/yenza/

Biological Sciences: BioGate: http://biogate.lub.lu.se/

Physical Sciences: PSIGate: http://www.psigate.ac.uk/homenew.htm

Science: SciSeek; http://www.sciseek.com/

South African data bases

SA NISC (South African National Inquiry Services Centre): (www.nisc.co.za)

For the social sciences and humanities, current and completed research reports can be found in the
    Nexus database system of the National Research Foundation (NRF).
    (http://www.hsrc.ac.za/nexus.html) .

For health related research healthnet – http://www.mrc.ac.za

The South African Data Archive (SADA) (www.nrf.ac.za/sada) is a record of South African and
    international survey data.

Some useful South African search engines identified by Mouton (2001) are the following:

        aardvark (http://aardvark.co.za)

        ananzi (http://ananzi.co.za)

        zebra (http://www.zebra.co.za)

        max (http://www.max.co.za)

        zaworm (http://www.zaworm.co.za/)

South African Government website: (http://www.polity.org.za/lists/govsites.html)

Non-governmental sites:

        SA non-governmental network SANGONET (http://www.sangonet.org.za)

        SANGOCO (http://www.sangoco.org.za)

Programme for Development Research (PRODDER) http://www.hsrc.ac.za/prodder.html)

REFERENCES
(***Note that the referencing convention followed here differs from the examples given in the book. This is to demonstrate the various conventions that are available and acceptable.***)

Bruce, C. S. (1994). Research Students' Early Experiences of the Dissertation Literature Review. *Studies in Higher Education.* Vol 9, No 2, pp 217-229.

Bruce, C. S. (1996). Supervising Literature Reviews. In O. Zuber-Skerritt and Y. Ryan (eds.) *Quality in Postgraduate Education.* London: Kegan Page. Pp 213-222.

Delamont, S. (1992). *Fieldwork in Educational Settings – Methods, Pitfalls and Perspectives.* London: Falmer Press.

Delamont, S., Atkinson, P. and Parry, O. (1997). *Supervising the PhD: A Guide to Success.* Buckingham: Open University Press.

Kumar, R. (1994). *Research Methodology: A Step by Step Guide for Beginners.* New York: Longman Press.

Mouton, J. (2001). *How to Succeed in Your Master's and Doctoral Studies. A South African Guide and Resource Book.* Pretoria: Van Schaik.

Neuman, W. L. (1997). *Social Research Methods: Qualitative and Quantitative Approaches.* Third Edition. Boston: Allyn and Bacon.

Rudestam, K. E. and Newton, R. R. (1992). *Surviving Your Dissertation: A Comprehensive Guide to Content and Process.* Newbury Park: Sage Publications.

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