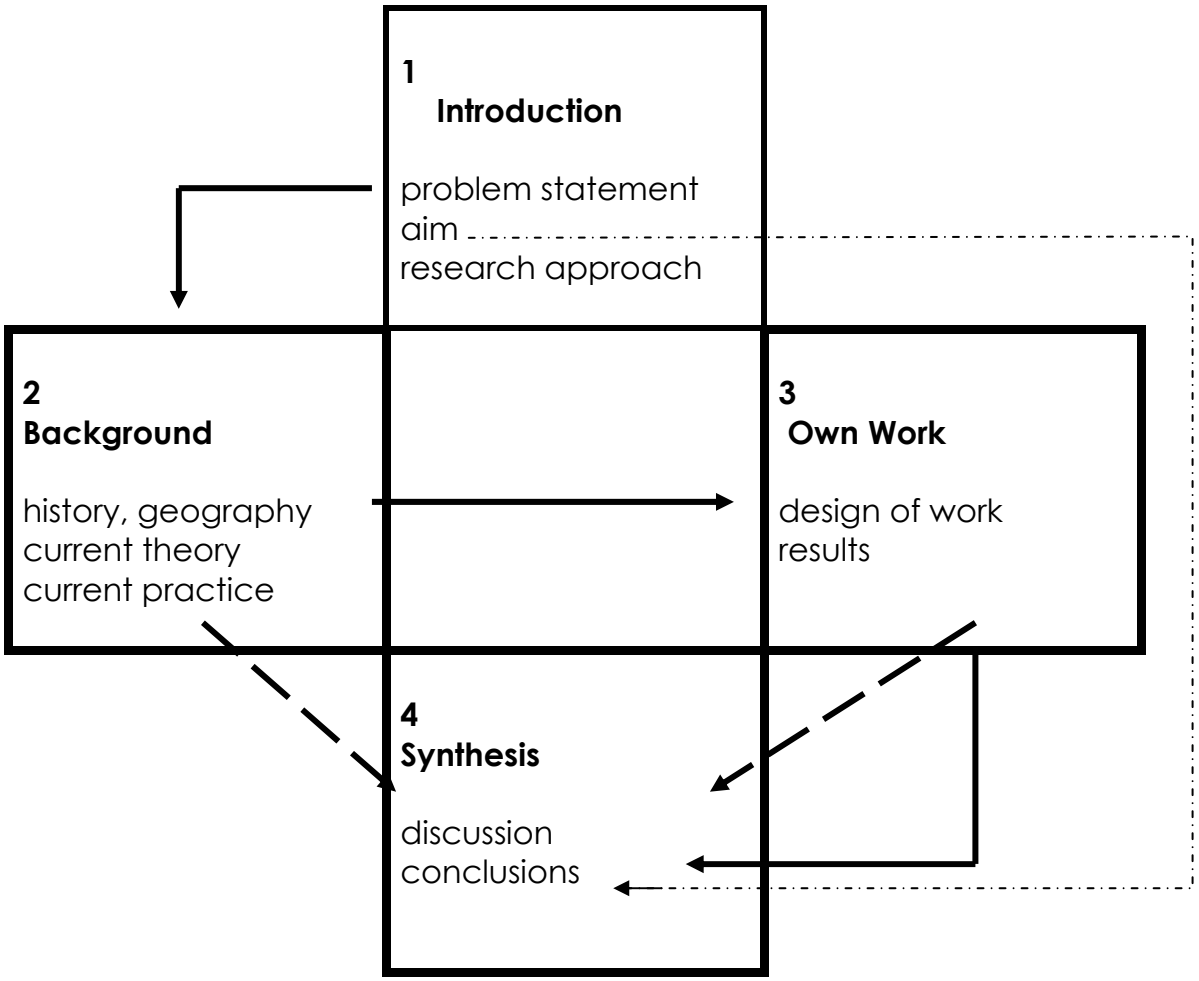
Introduction to Thesis Writing – Structures and Processes

Contents

1. **Thesis Structure**
2. **Resources for Thesis Writing**
3. **Audience Considerations**
4. **Finding Your Voice**
5. **Writing The Thesis**
    - **Overcoming Writer's Block**
    - **The Abstract**
    - **The Introduction**
    - **The Literature Review**
    - **The Methods**
    - **The Results**
    - **The Discussion**
    - **The Conclusions**
6. **Editing Your Writing**

1: Thesis Structure

The Structure of Theses in Experimental Disciplines



(Evans, 1995 p.5).

Alternative ways to organise a thesis

Traditional: simple	**Topic-based**
Introduction	Introduction
Literature Review	Topic 1
Materials and Methods	Topic 2
Results	Topic 3 etc
Discussion	Conclusions
Conclusions	
Traditional: complex	**Compilation of Research Articles**
Introduction	Introduction
Background to the Study + Review	Background to the study
of the Literature (background	Research article 1
theory & general methods)	Introduction
Study 1	Literature review
Introduction	Materials and Methods
Methods	Results
Results	Discussion and Conclusions
Discussion and conclusions	Research article 2
Study 2	Introduction
Introduction	Literature review
Methods	Materials and Methods
Results	Results
Discussion and Conclusions	Discussion and Conclusions
Study 3 …etc	Research article 3 etc
Discussion	
Conclusions	Conclusions

This table is adapted from Paltridge, B. (2000)Thesis and dissertation writing: An examination of published advice and actual practice, in English for Specific Purposes (forthcoming).

Basic Chapter Structure (Evans, 1995, p.8)

This suggested structure only applies to the literature review, methods, results and discussion chapters. The introduction and conclusion chapters have different structures.

Formal Introduction:
This may cover a few paragraphs at most and should have a link back to earlier parts of the thesis, present the purpose or function of the chapter and give an explanation/outline of the chapter body.

Body:
It is recommended that you do not have more than 4 major sections and not too many sub-headings in the chapter body. The report/thesis may start to disintegrate.

Conclusion:
This will state the significance of what you have found/ investigated/ discussed *(" What do we now know that we did not at the beginning of the chapter?", "what has been achieved?")*. Conclusions are important for the history/theory review chapters, method review chapter, the results and discussion chapter.

The Thesis - Preliminary and main sections

Thesis Project Report Sheet
(Identification and abstract and authorisation)
Certificate of Originality
Title Page
Abstract
Acknowledgments
List of Special Names (Glossary)
List of Abbreviations
List of figures
Publications and Presentations
Table of Contents
Chapter1 Introduction
Chapter 2 (title)
Chapter 3 (title) and so on
Chapter N Conclusions
References (or may be after each chapter)
Appendix 1 (Title)
Appendix 2 (Title) and so on

2. Recommended Reading/Sites/Guides for Thesis Writing

Books: (Many in Library and ILC)

Cryer, P. (1996) The research student's guide to success. Open University press, Buckingham.

Evans, D. (1995) How to write a better thesis or report. Melbourne University Press: Melbourne.

Kirkman, J. (1992). Good style: Writing for science and technology. E&FN Spon: London.

Madsen, D. (1992). Successful dissertations and theses: A guide to graduate student research from proposal to completion. Jossey-Bass: San Fancisco.

Sides, C.H. (1999) How to write and present technical information (3rd ed.) Cambridge University Press, Melbourne.

Eisenberg, A. (1992) Effective technical Communication. 2nd ed. McGraw Hill, New York.

Sites: (updated 23 Sept 2002)

UNSW

The Learning Centre http://www.lc.unsw.edu.au (Online & Links)

Visit UNSW Library study skills information pages http://www.library.unsw.edu.au/links

How to Write a Ph D Thesis
[Joe Wolfe School of Physics] http://www.phys.unsw.edu.au/~jw/thesis.html

Postgraduate Board
[Student representation, guides for presenting theses, and links to useful sites about research] http://www.postgrad.unsw.edu.au

Other Unis in Australia

STAR – UTS http://www.star.uts.edu.au

Australian Digital Thesis Project [Theses available in PDF files]
http://adt.caul.edu.au

Other Unis Overseas

How to Organise Your Thesis
[Carleton University, Canada - Department of Systems and Computer Engineering]
http://www.sce.carleton.ca/faculty/chinneck/thesis.html

PhD Thesis Structure and Content
[London University/Computer Science UCL]
http://www.cs.ucl.ac.uk/staff/c.clack/phd.html

On Campus Resources

The Independent learning Centre has a range of texts that can be used in the centre to develop your awareness of the writing structures required in a thesis and to further develop your English expression. For example:

- Beer D.F. (1992) Writing and Speaking in the Technology Professions: A Practical Guide. IEEE.
- Glendinning E.H. (1973) English in Mechanical Engineering, OUP.
- Templeton H. (1983) English for Mechanical Science, Heinmann.

3. Audience Considerations

While you are writing the thesis, the audience/readers' needs must be kept in mind. Knowing the background, interest, opinions and expectations of the reader assists you to select and highlight information that the reader needs or should be made aware of.
Your audience will include your supervisor and at least one other moderator (another engineer but not necessarily an expert in your field). You may also have fellow students present at your talk.
As a general rule, consider writing your thesis so another 4th year student could understand it. This will help to ensure that you do not skim over explanations of concepts or details that the examiner may expect to see.

What will examiners be looking for?

High standard of Presentation (have you followed the brief?)
- Meets specifications
- Clear and logical arrangement
- Clear and correct English, spelling and punctuation
- Good use of illustrations

Project management, quantity of work and completeness (have you done enough?)
- How well you manage a project
- How much you produce
- How complete/thorough the project is

Quality of your work (have you done it well?)
- Clear task definition
- Critical literature survey
- Methodology: Design/analysis
- Conclusions
- Degree of success (contribution-useful, new)
- Originality and initiative in the content

Your task is to convey to the reader/examiner in a convincing way what you have found out. Your thesis will take the reader from the aim to the conclusions in the clearest possible way. Consider:

- What is the topic/area you are researching?
- What is the problem you have highlighted?
- What is your aim? (In regards to the problem)
- What approach/steps will you take to achieve the aim? (This includes research and writing activities)
- What interesting, representative or significant results are there?
- What do these results mean?

4.Writing The Thesis

Overcoming Writer's Block

When we sit down to write, it can be overwhelming to imagine the whole text and feel confident that you have worked out how you wish to communicate everything you want to say. You may also be unsure about exactly what you are going to write. However, the act of writing can be a trigger for insights and a tool for clarifying your ideas. Many writers report that planning time to write and planning what to write in each time slot assists them to focus.

Try these approaches to get you started ...in any order ... see what suits you.

Establish a clear aim... a reason for writing ...certainty!
Create an outline/mindmap of the section of text you are writing …planning!
Just write ...free writing ... put anything down ...discovery!
Write the easy parts or shortest parts first ...confidence!
Write regularly ...every day /once a week ...skilled!
Talk about it ... anytime ... to yourself /the dog/ your peers …*understanding!*
Work for a reward. Schedule and compete a set amount of writing (It does not always have to be perfect). Then treat yourself to social, sporting or pleasurable activities ...*motivation!*

Writing Your Thesis from the Beginning (highly recommended!)

1: Analyse your task and the audience.
Know what is required - read guidelines and talk to your supervisor

2: Get a clear structure of the thesis.

Clarify the aim of the thesis
Write a *draft* introductory chapter (problem/aim/approach)
Devise a *draft* structure/plan/outline of the thesis
Write *draft* aims of chapters for the background section, the design and the results section

3: Begin writing the chapters.

Estimate how many words you need to write each week.
Draw up a schedule/timetable for regular writing and note which sections you will write.

Also schedule time for editing (allow at least 2 days between writing and editing)
Edit the chapters for structure, logic, clarity, relevance, expression

4: Be organised.

Arrange your "writing closet" so that you can work at your best.

Set up a master document in word using the style format (not direct formatting) so that headings and subheadings are consistent, labels for illustrations and lists of tables and references are automatically updated and created.

It is a good idea to keep *everything* in a folder with dividers for chapters and plastic sleeves for printouts, drafts, plans, & ideas. Take the folder to all meetings with your supervisor/s. Remember to make backups of your writing.

You may find it easier to focus on factual chapters (description of aim, rationale for method selection, description of methods, and results) before attempting interpretive chapters (discussions, conclusions

5. Be realistic

Have a specific task to complete each time you sit down to write.
Take breaks - check your posture often
Change the 'environment' or time of writing if need be
Writing is a creative process - you are creating a logic, a pattern from data, published information and your experience and insight - not always easy but certainly memorable!

Sequence for writing sections of the thesis?

Methods
Results/discussion
Literature review
Conclusions
Introduction
Abstract
Preliminary pages
References

5. Finding Your Voice

Plagiarism

Which of the following are not examples of plagiarism? Why?

1.Copying an essay from another student and submitting it as your own.

2.Copying a journal article or a section of a book and submitting it as your own.

3.Lifting sentences or paragraphs from someone else (essay, article, book, lecture, etc.) That is, quoting from them verbatim, without using quotation marks and without proper acknowledgment.

4.Lifting sentences or paragraphs from someone else, without using quotation marks, but with proper acknowledgment

5.Using significant ideas from someone else, but putting them into your own words and not acknowledging the source of the ideas.

6.Using your own ideas, but with heavy reliance on phrases and sentences from someone else without proper acknowledgment.

7.Excessive reliance on other people's material, that is, direct quotations (with quotation marks and with proper acknowledgment).

What are some good reasons for citing sources?

1.

2.

3.

Sources can be used in many ways:

To give a definition
To provide an example, statistic, case, description
To provide evidence to support your claims/interpretations
To provide reasons and arguments that you will comment upon

Referring to the Literature

Reviewing the literature at university requires you to make judgements about what is already known about a topic and what current research has achieved. There are many ways you can manipulate language to present your evaluation. These pages are designed to assist you to become familiar with the manner and tone your field uses when talking about other researchers' work in a public domain.

REPORTING STRUCTURES

As you are summarising and highlighting specific aspects of published research, you can use a combination of introductory phrases and reporting verbs to achieve a clear and concise review. Remember to reference!

Verbs are 'action' words that tell us about actions and states (mental and physical). For example the words **run, test** and **believe** are verbs. Reporting verbs are used to refer to what researchers did, felt or thought. Reporting verbs are not always neutral, so you should ensure that you choose a reporting verb or introductory phrase that matches the original writer's /source's intention.

To report that a writer is describing or explaining (states, describes, adds,)
Baker (1989) presents statistics that show how ….

To report that a writer is recommending or feels positive about something (urges, desires, supports)
Barker (1989) encourages all teachers to ….

To report that a writer is expressing a negative comment (disagrees, dismisses, argues against)
The education system has been criticised for …..(Jones, 1991, p.257).

To report that a writer is not 100% certain (questions, doubts, hesitates)
Dysart (1982, p.18) suspects this result is due to …

Here are some examples of reporting verbs and phrases from a literature review section of a chemical engineering journal article. The journal authors have focused on what other researchers have done and how successful the research has been.

A few research groups have paid attention to the miscibility issues between liquid crystalline copoly and polycarbonate [5-7].

DiBennetto's group {10} had tried adding … and obtained some improvements…

Baird's group [11,12] studied binary blends of PEI and Vectra A900 and found they are immiscible.

Whereas some authors [7-9] failed to detect any multimolecular association, others [10-12] found well-defined micelles.

Sometimes a reporting noun structure is used instead of reporting verbs to present research. This is useful for comparing and integrating a body of work (ie multiple references) on a similar topic. These usually have a structure like:

'it is believed/known/….
or
'it has been found……'

"It is well known that in these cases, the block copolymer may associate in solution to form … [1-4]."

Including your voice
In most cases the reporting verb or phrase you use will be an accurate reflection of what someone intended, has done or thinks. In these cases, you are basically summarising and paraphrasing. However, using other words , such as adverbs and adjectives, can enable you to include your own judgement of the source.

Activity 1.
Do you think the following reporting verbs can be used to make a positive, negative or neutral comment on a source?

Jones (1999) states that… comments that… believes that … agrees that …. takes the questionable view that …	clearly asserts that … says that … concludes that … mistakenly argues that ….	strongly argues that … observes that … claims that … suggests that contends that …

SOME NOTES ABOUT CITATION AND VERB TENSE

(This section is adapted from Swales, and Feak (1994))

Tense choice in reviewing previous research is subtle and somewhat flexible. The following, therefore, are only general guidelines for tense usage. Several studies have shown that at least two-thirds of all citing statements fall into these four major patterns.

Patterns I and II-reference to single studies – simple past or present perfect tense.

Jones (1987*) investigated* the causes of illiteracy.
(PAST TENSE, ACTIVE VOICE)

The causes of illiteracy *were investigated* by Jones (1987).
(PAST TENSE, PASSIVE VOICE)

Jones (1987) *has investigated* the causes of illiteracy.
(PRESENT PERFECT TENSE, ACTIVE VOICE)

The causes of illiteracy *have been investigated* by Jones (1987).
(PRESENT PERFECT TENSE, PASSIVE VOICE)

Pattern III-reference to several studies/areas of inquiry – present perfect tense.

The causes of illiteracy *have been* widely investigated (eg Jones, 1987; Ferrara 1990; Hyon, 1994). (PASSIVE VOICE)

There *have been* several investigations into the causes of illiteracy (eg Jones, 1987; Ferrara, 1990; Hyon, 1994) (PASSIVE VOICE)

Several researchers *have studied* the causes of illiteracy (eg Jones, 1987; Ferrara, 1990; Hyon, 1994) (ACTIVE VOICE)

Pattern IV-reference to the state of current knowledge – simple present tense

The causes of illiteracy *are* complex (Jones, 1987; Ferrara, 1990; Hyon, 1994) (ACTIVE VOICE)

Illiteracy *appears to have* a complex set of causes (Jones , 1987; Ferrara, 1990; Hyon, 1994) (ACTIVE VOICE)

Swales and Feak claim that pattern IV (simple present tense) gives the most authority to what has been found/discovered by the studies. It is possible that different areas of scholarship will have somewhat different preferences in their use of phrases, tenses and citations. You should notice what patterns are conventionally used in your discipline.

USING ADJECTIVES

Adjectives describe the qualities and characteristics of a person or a thing.

In the context of discussing research in your field, rate the connotation of the following adjectives as:
positive [+]
negative [-]
neutral [0],
or ambiguous [?] (It depends on the context the word is used).

unusual useful simple ambitious preliminary elegant		limited significant traditional important modest small scale		small careful exploratory innovative flawed unsatisfactory		restricted competent remarkable impressive interesting complex	

To show that an evaluation is thorough, fair or unbiased, writers may use a number of adjectives.

"Wilson's (1995) preliminary investigation did reveal one potentially significant relationship between…"

USING MODALITY

In some cases we can not make comments about research, methods, results or recommendations that are 100% certain. Instead, writers can use verbs, adverbs and adjectives to express degrees of certainty, possibility, and probability.

Level of probability	adverbs	Modal verb	'I' clause	'it' clause
high median low	certainly probably possibly	must be may be might be	I'm sure I think I suspect	It is certain It is probable It is possible it seems that

In addition to expressing possibility and probability, the modality system also allows writers to express obligation and inclination towards future action or thought. Modality can also be expressed in the type of vocabulary you select. For example, saying something is 'essential' or 'required' expresses certainty and obligation.

"Another possible mechanism for circumventing the entropy penalty would be through the formation of a branched structure…"

Level of obligation	Modality	Modal verb	'it'/we + clause
High	definitely need to	Must	it is necessary
Median	probably need to	Should (?)	it is recommended we recommend
low	may need to ..	might	it is advisable we advise

USING COMPARISON

When you compare or contrast research you are making a judgement. There are many ways to make comparisons and a few example structures are shown in the table below.

Adjective/adverb	Comparative	Superlative
accurate	less accurate than more accurate than	the least accurate the most accurate
reliable	more reliable than	the most reliable
promising	more promising than	**the most promising**
narrow	Narrower than	The narrowest
simple	Simpler than	The simplest
good/**well**	better	the best
bad/badly	worse	the worst

Conclusion

Using sources effectively helps you build an effective argument or justification for your interpretations and your ideas. The literature review is one place where you will use evaluative language; You will also be comparing your work to the literature in the methods, results and discussion sections of your thesis. Above all you should be able to comment on the work of others in a manner that is accepted by your peers and that shows understanding, reflection and insight.

6. Writing Well- Thesis chapters explained…

Writing The Abstract

Possible stages of a thesis abstract include:

1. Introduction to the area covered in the study
2. Statement of the aim of the study and its rationale
3. Brief description of main findings
4. Implications of findings and conclusions (Swales 1990)

Length will range from 200 - 350 words
Abstracts may be placed in databases without the rest of the thesis.

Example Abstract (Andrewartha 1999)

The safety of passenger vessels is a prime concern for designers, owners and passengers. The Severe-Weather criterion is a dynamic stability criterion that is published by the International maritime organization (IMO) to prevent the capsize of vessels that are rolling in beam wind and waves. Many international departments have also adopted the Sever-Weather Criterion in their national standards of stability. Recently there have been major developments in the area of high-speed passenger ferries, with large increases in the number being built and operated around the world. The designers of high-speed monohulls have raised concerns because these vessels have been having trouble passing the IMO Severe-Weather criterion. The unique characteristics of these vessels means that the formula used to predict the rolling amplitude is antiquated and contains flaws when applied to them. The background of the formula used to predict the rolling amplitude for the Sever-Weather Criterion was investigated. Two high-speed monohulls were used as a case study to evaluate how accurately the formulae was able to predict their rolling amplitudes. Several different techniques were used, including a series of model tests. Results showed that the formula over-predicted the rolling amplitude of the vessels by approximately 2°. However, this did not have a major effect in helping vessels pass the criterion. Thus it is recommended that different methods of increasing the stability of high-speed monohulls be investigated.

Writing The Introduction

You may find it useful to write a draft introduction to give yourself an overview of the whole thesis. This draft will be revised after you have written the body of the thesis and the conclusion.

Possible stages for the Introduction

1. Introduction to general area of study
2. (Brief) review of the current state of knowledge in the area
3. Indications of gaps, shortcomings, problems in research to date
4. Statement of the aim of your research, especially how it will fill the gap, solve the problem etc…
5. Thesis plan- outline of the chapters

Length may range from 3 pages to about 8 pages.

Sample Introduction - extract
This seems anomalous because a reduction in wind-speed is allowed but a reduction in the rolling amplitude $\theta 1$ (calculated from Equation (A1.3)) is not allowed. One would assume that for reduced wind-speeds, the waves encountered by a vessel would also be smaller, causing smaller rolling amplitudes. As a result it is believed that the formula used to predict the windward roll angle $\theta 1$ is flawed and over-predicts the rolling amplitude for high-speed monohulls. Thus, it is desired to evaluate the actual rolling amplitude that these vessels will experience.

Comments :

- This section of the introduction indicates the gap/shortcoming in current formula used – stage 3 – and presents the aim of the thesis – stage 4.

- Some wordy style in the last sentence..Can be more direct?

Thus, this thesis will evaluate the actual rolling amplitude…

Thinking & Writing the literature review

Aims

- To show you are aware of current state of knowledge (theoretical, methodological, applied) that relates to your research topic
- To indicate a gap/question worthy of investigation

The literature review is not a summary of past work. The literature review evaluates the current state of knowledge and places your work in context. You need to highlight a gap/problem/possibility that is worthy of investigation – The literature review serves to *create a research space* for your work.

Structure

First, try writing a page which summarises your ideas on the area. How can you structure your review to foreground what is important and related to your research?

Starting to write-

1. Sort your notes by grouping authors and articles

Compare and contrast different viewpoints/theories/methods
Chronologically — from oldest to newest
By theme or topic
By theoretical approach
Contrast authors who disagree
By research method
Group studies with similar faults or good points
Be clear about whose work is used- reference!

2. Write a plan, mind-map or flowchart of your literature review topic areas and your ideas.

3. Develop your argument (that this is an important area and this problem is worthy of further investigation) by:

- linking literature to your research aim (relevance)
- showing the achievement and limitations with current knowledge, processes, systems (critique/evaluate)
- being gentle and polite (tone/style)
- pointing out the potential or the need to solve this problem (justification)

4. Back up your opinion with facts and theory from the literature.

5. Account for different opinions, don't ignore the opposite view

6. Make clear connections between the sections of the review -eg informative subheadings, mini- intro/concluding sections for large parts of the lit rev.

7. Draft and redraft — editing is very important

8. Be clear about whose work is presented- reference all sources of information

Example extracts from a Literature review chapter
Peach gives details of one further equation that has been proposed by Bureau Veritas for calculation of radius of gyration in roll. It is given below…
Blagoveshchenskii (1962) also gave an empirical formula for the valuation of total mass moment of inertia. The formula takes into account the shape of the hull and the dimensions of the main hull and is as follows:…
In the development of the Severe-Weather Criterion, several formulas were proposed for the calculation of the rolling period of a vessel. Equations (3.13) and (3.14) are other empirical formulas for calculating the radius of gyration and they take into account the length, beam and draft of a vessel. However as outlined in sections 33.5, the …

Writing The Methods

AIM: to describe clearly and logically what you did.

Introduction:
Remember that all chapters should have an introduction and a conclusion

Body:

- give clear hypotheses or research questions -state them!
- show explicit choice of methods - review the methods and give reasons for selection
- present a clear design of instruments - describe the way you applied the method

Possible Structure of Traditional Methods section?

Sample/subject
Instruments
Procedures/data collection
Data analysis (NB: description of statistical tests may be left till the results section)

Other possible structures?

Describe general method State limitations Give hypotheses Describe design of experiments/procedure Describe design of apparatus/instruments

Identify hypotheses General tool/ apparatus chosen Justify Specific tool designed Reasons for design Limitations

A common question: What about multiple methods?

Evans (1995) advises writers to split the methods chapter once you get to the design of the instruments. He also recommends presenting results after describing each instrument.

Lindsay (1995) advises that you initially gather in one chapter the materials and techniques used in most of your experiments. This will save you repeating yourself. Then start a new section or chapter titled 'experimental section' which describes the unique/previously unmentioned procedure for each experiment. He also recommends presenting results for each experiment after describing each experiment.

Poor	OK	OK
Method 1 Method 2 Method 3 Results 1 Results 2 Results 3	Method 1 Results 1 Method 2 Results 2 Method 3 Results 3	General Method Experiment 1 Results 1 Experiment 2 Results 2

Example Methods - extracts
Chapter 5. Methods It is possible to calculate the coefficients of motion using several methods that are based on theory and empirical data. This chapter contains details of several of the calculations that were performed for the two vessels that were examined, Y164 and Y177…
The models were also tested in spectra with significant wave heights of 2m and 4m. Most high-speed vessels have an operating restriction of 4m significant wave height. Thus this was determined to be the most extreme seas that most high-speed monohulls would encounter. The spectra with 2m significant wave height was simply chosen as an intermediate point on the testing matrix…

Writing The Results

Aim: To show what you found .

Some supervisors recommend combining results and discussion sections due to the length of a thesis and the likelihood that a reader will 'forget' the results by the time they get to the discussion.

Making sense of data.

When you have masses of data find ways to group, code and simplify into meaningful arrangements.

- Look for trends, blips, expected and unexpected relationships or outcomes.
- Consider the best way to present the data: table/graph/chart?
- VERY IMPORTANT: Check that tables, figures and diagrams are clearly labelled, logically and legibly presented, and include a key for codes or abbreviations used.

Possible Stages for The Results Chapter

Webb and Drury (1991) describe 5 stages that you can choose to use when presenting results.

1. Background information
2. Description of table or graph
3. Statement of result
4. Statement of result by comparison between results
5. Statement of results by comparison with published results

NOTE* Stages 3, 4 ,5 : You usually only need one of these (but you can use more than one) and you may repeat the stages several times. In some fields stage 5 is not included in the results, rather it is included in the discussion.

Example results- extract

7.1.2 Comparison of Damping Coefficient with Theoretical Calculations

Direct comparison of the values in Tables 7.1, 5.3 and 5.4 for both vessels is possible in the case of the roll-damping coefficient. This is because damping is only affected by hull shape. A comparison of experimentally measured values and theoretical predictions is shown in Table 7.2 for Y164 (without keel) and Y177.

Table 7.2 –Comparison of Damping Coefficients

Vessel:	Y164 (without keel)	Y177
Measured:	0.0560	0.0629
Strip Theory:	0.078	0.036
Eqn. (5.10)	0.0456	0.0463

Neither of the two empirical methods seem able to accurately predict the roll damping with strip theory being the most inaccurate. A closer approximation is possible by multiplying the results of Equation (5.10) by 1.25…

Writing The Discussion

Discussing your results- discuss with supervisor when to do this (part of results or separate section/s?)

Aims:

- To explain what the results 'mean' (reasons why, causes or processes behind the results - what happened to get this result?
- To compare your results with what was expected from existing theory – to see what new ideas/understandings/approaches emerge.

Often the act of writing the discussion helps you work out what your conclusions are (Evans 1995). Evans recommend the following processes:

- Write down all the things you now know that you didn't when you started the research.You may end up with 20-40 items. (post-it notes)
- Group the items into 3-5 groups
- Check that each group and its items corresponds to your original aim.
- Give each group a heading and decide on the order of the headings
- Begin writing a draft…

Possible stages in a discussion. (Webb & Drury 1991)

1. Make generalised statements about the results (how typical might these results be in other situations.)
2. Refer to previous research and theory and compare it to your findings (to explain causes and reasons for results)
3. Indicate which outcomes were expected or unexpected.
4. Give reason/explanation for surprising results
5. Make claims to form a hypothesis that further generalises what the results may suggest.
6. Quote previous research to support your interpretation and hypotheses
7. Point out remaining gaps/questions/limitations

You need to choose which stages are appropriate for your results and depending on the literature. These stages may appear in the above sequence as the whole discussion. You may repeat a sequence if you have a number of points to make in the discussion. These stages may be included after summarising the results so you present a combined results discussion section.

Example Discussion -extract
… This effect is due to the fact that the keel causes a significant amount of eddy damping. For larger roll angles the roll velocity is increased and because eddy damping increases in proportion to the square of rolling velocity, the damping is increased…

Writing The Conclusions

-A very Important part of your thesis!

AIM: to demonstrate that you have fulfilled the aim of your research

Only draw conclusions from your discussion (not your head)
Only 2-3 pages long (some texts recommend a paragraph but I think they are referring to Research articles)

Don't just summarise the discussion – state the significance of what you found/made/proved.

Recommended sections in Mechanical and Manufacturing Engineering UG thesis

1. An introductory section describing the problem and the thesis.
2. Your results summarised in a logical order
3. Any limitations on your results
4. Suggestions for future work

Sample Conclusion - Extracts
The model testing that was performed gave good results in all areas. It was found that the addition of a centreline keel increased the roll damping and thus reduced the rolling amplitude of the vessel. It was also found that a single-chined hull-form had higher roll damping that a double -chined vessel. Thus the single-chined vessel recorded roll. All vessels recorded a larger damping movement than the amount assumed by the Severe-Weather Criterion. The damping was also found to be non-linear with respect to amplitude of rolling.
It is also recommended that more attention be paid to the wind speed that a marine department specifies. Most high-speed monohulls have low displacements for their size. As a result the ratio of windage area to displacement is quite large, which results in large wind heeling levers. Further research should look at wind data for areas where high-speed vessels operate and a more accurate method of calculating the wind heeling levers.

The Editing Process-Things YOU CAN do!

- Give your text the drawer treatment
- Get another reader's response
- Use checklists
- Have a systematic approach to editing-
  a) Requires time management skills
  b) Requires reading a text more than once; each time with a specific purpose.
  overall structure
  sections/chapters
  grammar, spelling and punctuation
  formatting conventions of reports.

- Develop an awareness of where you have problems with writing so you know what to look for and what to work on to improve (visit TLC!)