Academic writing

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You need to learn how to...

- Organise writing clearly and logically
- Handle evidence appropriately in writing to present a structured and logical argument
- Explain concepts in formal context
- Structure your work correctly for the appropriate audience
- Understand strategies for revision at the document, paragraph and sentence levels
- Understand grammatical and stylistic usage
- Be able to edit and refine your own written work

Sources of information

- General University notes for academic skills – topics include: reading academically, writing effectively, search strategies, bibliographic software, referencing your work, giving a talk. See
  http://www.birmingham.ac.uk/undergraduate/support/asc.aspx
  https://intranet.birmingham.ac.uk/as/libraryservices/library/skills/
- Grammar: an introduction to traditional grammar
  http://www.soton.ac.uk/∼wpwt/notes/grammar.htm
- Engineering Communication Centre, University of Toronto it offers a range of interactive tutorials
  http://ecp.engineering.utoronto.ca/online-handbook/components-of-documents/

  one is specifically a guide to writing lab reports,
  http://ecp.engineering.utoronto.ca/online-handbook/types-of-documents/lab-reports/

Academic writing

What experience do you have?

- Technical reports
- Technical letters
- Conference papers
- Journal papers
- Project reports
- ?? Web pages
- Informal writing
- ...

Different types of documents need differing styles

What difficulties might you face?

- Foreign language
- Dyslexia
- Lack of experience
- Can't spell
- Don't understand grammar/rules
- Difficult to explain myself
- ...

Different people have different issues

Technical teport writing

The purpose of a technical report is to communicate.

You wish to communicate what you did, why you did it and what you have found out.

Types of reports

- Lab Report
- Blog
- Magazine Article
- Essay
- **Technical Report** ← what this lecture is about
  - Academic papers
  - Industry White Papers
  - Description of a project undertaken

And they may be published on paper or on-line. The rules do not change.

Structure of a technical report

- [Title page]
  - name, affiliation, date, contact details, etc.
- [Declaration]
  - who did this work?
- [Acknowledgement]
  - to those who have helped or influenced your work
- [Contents]
  - sections, sub sections and page numbers
- Abstract
  - stand-alone summary of report
- Introduction
  - provides the motivation and context and outlines other related work
- Main technical sections
  - theory, experimental method, results, discussion
- Conclusions
  - and appropriate future work
- References
- [Appendices]
  - anything which would interfere with the continuity of the main report (typically detail)

Report function

- Abstract summarises the work presented
- Introduction (provides context)
- Itemise the key work(s)
- Identify where your contribution fits
- Present key ideas, describe methods
- Present Results
- Draw Conclusions

Remember, your report is not a detective novel..

The Abstract

- Must be stand-alone
- Must not contain citations
- Is a concise summary
- IS VERY IMPORTANT

- Generally an abstract should be five or six sentences
  - What is the problem, and why is it a problem?
  - What is your idea for a suggested solution?
  - How did test your idea?
  - What results did you get?
  - Why is that useful?
- Its a good idea to write the abstract before you begin (even if you re-write it after you finish)

Introduction and Conclusion

- Again they should (as a pair) be stand-alone (Not everyone wants to read the detail)
- The Introduction should motivate why you have done the work, demonstrate your awareness of related literature, and state what your objectives are
- The conclusion should:
  - Make it clear what the "take away message is"
  - Demonstrate analysis and synthesis that you have undertaken
  - Explain any limitations in your work
  - Detail future work to be undertaken

  On analysis and synthesis – there is no room for "I think..", "I believe" – technical reports should take an objective and scientific standpoint

Citations and references

- Learn how to format a reference and how to cite it
- There are two major formats in use
- Harvard – cite with Name and Date
  - Much preferred for technical reports
    http://www.lib.monash.edu.au/tutorials/citing/harvard.html
- IEEE – cite with Number
  - Much more compact so used is paper based IEEE and ACM journals
    http://www.lib.monash.edu.au/tutorials/citing/ieee.html
- References
  - should provide a replicable audit trail
  - so.. they need to be complete and in a standard format
  - they need to contain enough detail to locate the same source again
  - do not include ISBN, library call numbers
- IEEE convention – uses a single sequentially order note number to cite all references to each source mentioned in the text [1]

Citations of on-line documents

- A number of sources may only be available on-line
- A good rule of thumb is – if you can identify the author(s) name, and a name for the on-line publication, date of publication – then cite and reference it in the normal way (and stating date accessed)
- If it is just a "web page", then it should not be in your references – maybe it should be a footnote (or if you have lots then consider a "Web Page References" section)

Academic integrity and plagiarism

- Plagiarism is using someone else's work but not indicating that it is not your own
- All work you submit for marking must be your own original creation
- Plagiarism is what you do when you copy without acknowledging your sources
- There are academic conventions to acknowledge sources
- If you cut and paste words from anywhere else, and you do not attribute those words to the original author/webpage then that is plagiarism
- Plagiarism is cheating and an attempt to defraud, and
  - We run programs to identify plagiarism
  - There are disciplinary procedures for people identified plagiarising
- If you do cut and paste then you should "quote" – however, it is rare to quote (at least in engineering) and would be considered as not appropriate academic writing

Checklist before you submit

- Have you followed the formatting instructions, and kept to length limitations
- Does the abstract tell me what you did, why you did it and what I will learn from it?
- Are the Introduction and Conclusion stand-alone, and are there some take away lessons in the conclusions?
- Have you adhered to a referencing / citation convention?
- Have you ensured that there are no references without full provenance?
- Does the writing "tell a story" without getting bogged down in unnecessary detail? (Detail → Appendices)
- Is the grammar and spelling checked?
- Is the "voice" scientific and objective?
- Are all arguments you make based on sound evidence?
- Have you demonstrated awareness of others' work on this topic?
- Have you fully explained the research method you have used?
- Could you have used tables or figures to replace some of the writing?
- Are you *absolutely sure* that there is no (uncited) copied text in your report?
- Do you think *you* would have found your report informative, understandable and interesting if you had read it before you did all that research?

Work and improve over time

- Have a plan
- Do good work
- Record your work
- Analyse the results
- Capture the whole process
- Meet your deadlines

Some aspects will apply equally to **every written task**

Use opportunities to refine your process

These are skills for life

Information needed

- Gather information before and during writing
- Begin to organise information as you obtain it
- Information from others – record full bibliographic details
- Information you generate – keep a complete logbook record

Presenting results (1)

- Whats best? – graph, table, histogram, bar chart, scatter gram
- Does data highlight the scientific goal?
- Do labels reflect the scientific goal?
- Is the caption complete?

Presenting results (2)

- May be easier to draw by hand then scan
- Describe the important features of your illustration in the results section of your report
- Figures are labeled
- Can the reader find all your results easily?

Designing figures

- What needs to be in a graph?
- Axes must be labelled with
  - Entity being measured (e.g. amplitude, frequency, no. errors, time, . . .)
  - Units of measurement
  - Values in units along axis
- Meaning of curves or symbols must be shown: use legends or labels, caption
- Captions must be fully informative

Revision

- Reread what you wrote
  ... imagining yourself as the audience
- Does information come in the right order?
- Are all parts present?
- Is it complete?
- Check systematically for errors of any sort in a document – read through more than once, each time checking for different type of error

Writing skills – style (1)

- Use the third person
- Passive voice:
  "The transducer was calibrated . . . "
- Neutral, informative tone
- Avoid colloquialisms:
  POOR: "The final design was brilliant!"
  GOOD: "The final design had the best signal-to-noise ratio"
- Be specific; refer to figures by number
- Be concise
  - Can you use more shorter sentences?
  - Can you say it in less words
- Use figures, diagrams, equations when they're more concise and accurate than words would be
- Choose figures carefully

Writing skills – style (2)

- Use standard mathematical notation;
  - variables should have a single-character name
    POOR: Imp = V/I
    GOOD: Z = V/I
  - Define variables
  - Specify units
  - Capitalize and space numbers and units correctly:
    6 kHz not 6KHz
    50 mm
    8.3 Fd, 60 dB not 60 Db

Writing skills – style (3)

- Create complete sentences
  POOR:
  "A run-on is more than one sentence, it is often created by using a comma instead of a full stop or semi-colon, and did I remember to tell you about punctuation in general?"
- Avoid ambiguous pronouns:
  POOR:
  "This was then run through the other one."
- Define acronyms, abbreviations at first occurrence; use them for essential terms
  "...obtained by Magnetic Resonance Imaging (MRI). The MRI scanner was 1.5 T ..."

Example citing references

- In text, pick the most graceful way to refer to reference(s) needed

  "...as shown by Atal and Hanauer[1]. ..."

  "...Linear prediction is a commonly-used method [1,2,3]..."

  "...Smith used ultrasound to image the tongue[3] this was further developed Stone [4,5] and subsequently by Storey et al [6]"

1. Atal, B. and Hanauer, S. (1972) Title of article. Title of Journal 32:4, 167-178.
2. Flanagan, J. (1975) Title of Book. Berlin: Springer-Verlag.
3. Smith, P. (1976) Title of chapter, in L. Jones, ed., Title of Book. Cambridge: Cambridge Univ. Press, 154-198.
4. Stone, M. (1983)...
5. Stone, M. (1989)...
6. Storey, M., Stone M, and Smith, P. (1992) ...

How can you build on this lecture?

- What do you find easy?
- What do you find difficult?

- Write down a list of three aspects of writing skills which you think that it is important you improve
- Make a plan of how you will make these changes

- Learn by doing

Making a presentation

- Maximum number of slides – one per minute!
- Optimal number of slides – one per 2 minutes
- Use slides as a reminder of what you will say
- During your presentation, do not read what is on the slides
- 100 words maximum on each slide

Organisation – 10 minute talk

- Title slide (Name and affiliation) 1
- Outline slide (Major sections) 1
- Introduction (Wider research context) 1
- Main text (method, apparatus, results) 4–6
- Conclusions 1
- References 1

Nervous?

- Hints for overcoming nervousness:
  - Memorise the first 2–3 sentences (opening sentences)
  - Make sure you have key words on your slide to trigger your memory

Acknowledgements

This material is mainly reproduced (with some modifications) from lecture notes at the Southampton University
(http://www.ecs.soton.ac.uk/∼saw)