ELEC6021
research methods
October 2012

Report Writing
or
a few useful things about writing

Dr Su White
saw@ecs.soton.ac.uk

http://www.**edshare**.soton.ac.uk/3451/

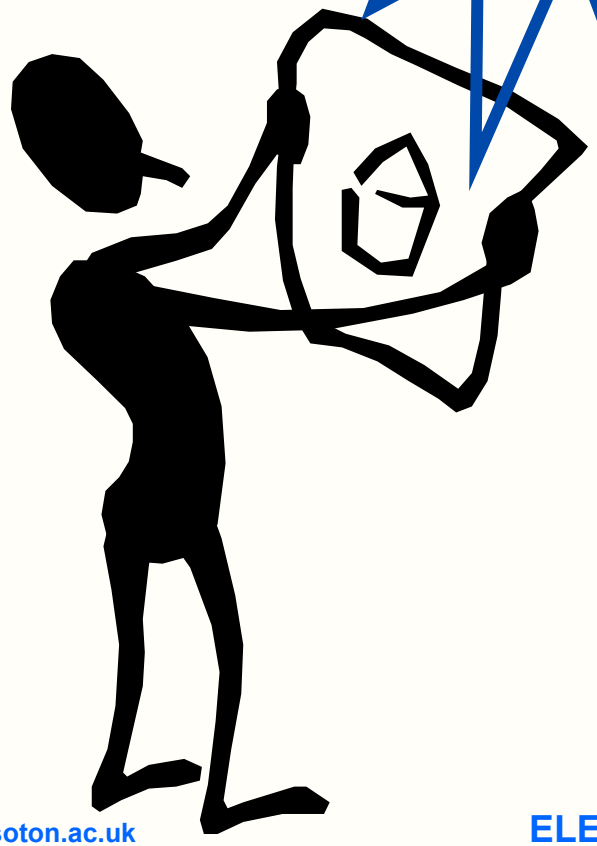
The plan

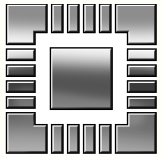
I will skip over some slides, but use them as notes

- Agree what we want to learn
- Important report writing guidelines
- Conclusion/reflection

but remember
I can only talk
you have to **do**

Learn to write by writing and reading example documents





Introduction and Objectives

How I will run this class
What I want
What do you want?

What do you want to learn today?

Think about how you write:

- What can you already do wel which will be useful?
- Where are your weaknesses‘

Based on this reflection

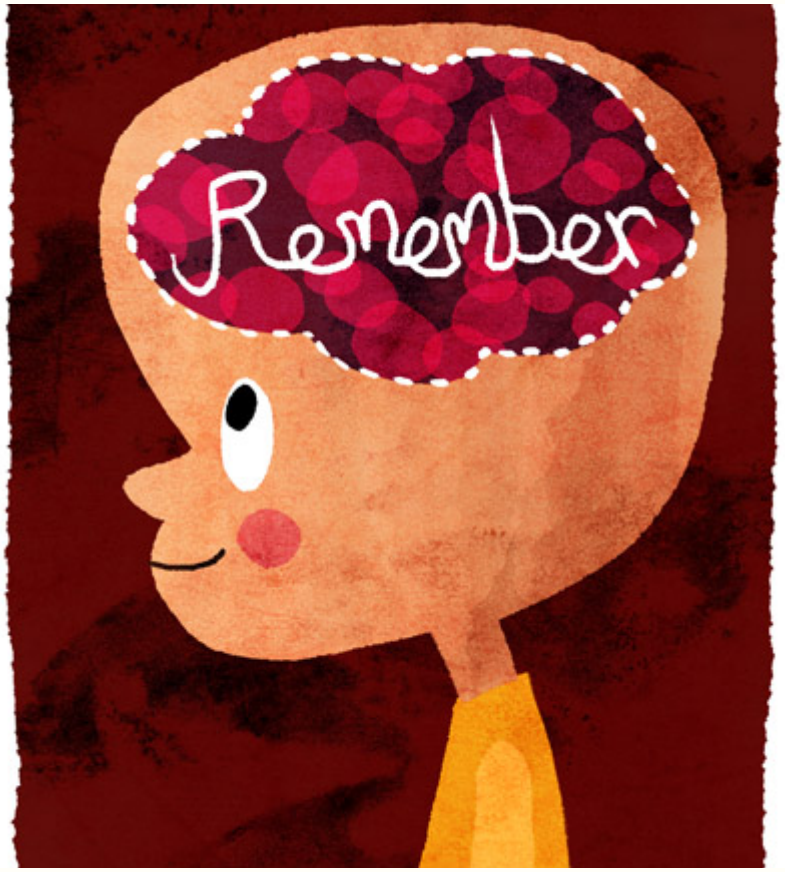
write down **three** things you would like to get out of the session today

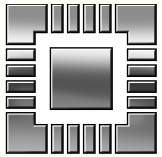
saw@ecs.soton.ac.uk

You can go back to these notes

Remember these notes when you need to double check

Look at them again with friends to understand what I have been saying ☺

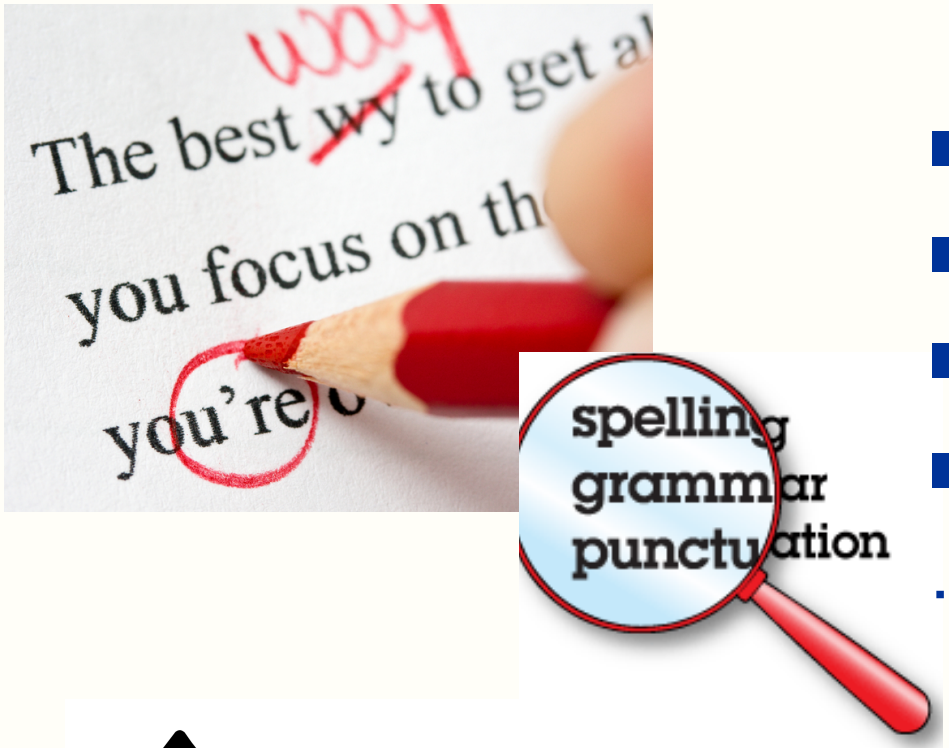




You need to learn how to...

- 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 for 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

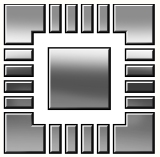
Typical Wants



- Layout
- Proof reading
- Referencing
- IEEE conventions

…these are minor details – check out the regulations, follow the pointers in the lecture

IEEE



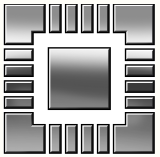
Three things….

I asked you to think about how you write:

- What can you already do well which will be useful?
- Where are your weaknesses?

…and to decide on three objectives for today

- Turn to a neighbour
  - Explain your writing experience
  - Discuss what you think will be important and why.



Feedback

Tell the rest of the class….

- Examples of objectives
- Why does it matter?

Sum wondeful peeple gt evrytng write 1st thyme

NB spell checkers do not correct all mistakes

- This information/class is not for you!!
- But you may be able to help your friends and colleagues
- You may learn from helping them
- Btw…
  can you write down the correct version of my heading?

saw@ecs.soton.ac.uk

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.academic-skills.soton.ac.uk

  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://www.ecf.utoronto.ca/~writing/interactive.html
- one is specifically a **guide to writing lab reports**,
  http://bit.ly/toronto-lab-reports

Use good technical writing as a model

- What sources of technical writing can you identifv?

bbc.co.uk BBC home

Read popular science to help Learn how to write technically

Dr. Dobb's Software Tools for the Professional Programmer

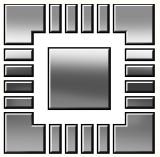
This is not about

- The process of doing your research

This is about

- The process of how you **record** and **present** the process of doing your research

The good news,
you already know something about this…



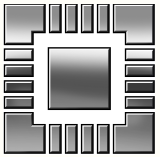
Focus: academic writing

What experience do you have?

- Technical reports
- Technical letters
- Conference papers
- Journal papers
- Project reports
- ?? Web pages
- Informal writing
- ++
  - Different formats 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

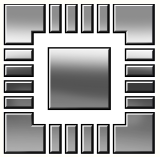


Last week I read something in the Guardian that said that tea was nothing like as popular a drink as it used to be. Apparently the general public think that is not particularly satisfying, and show an increasing preference for coffee. Certainly it looks that way in my office, although maybe coke is more hip. But it occurs to me that there could be a number of reasons, other than change in taste, for this decrease in popularity. Perhaps the quality of the tea has changed? Or perhaps people have forgotten how to make tea properly?

Certainly one of the things that bugs me is the American custom, when you order a tea, of bringing you a cup of hot (but certainly no longer boiling) water, and a selection of tea bags; the Americans are so obsessed by choice that they have forgotten taste. So I decided to conduct a survey. I made two cups of tea for everyone in the office – one from a big pot of tea, and for the other I put hot water into the tea cups, and tea bags on the saucer. Three quarters of the people expressed a firm preference for the tea from the pot, and no-one preferred the tea bag in the cup.

This certainly shows that one of the reasons people are going off tea is that it is often badly made.

What's This?



Technical Report 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.

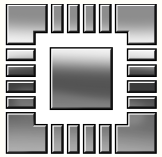
Before Getting Started

- You wish to communicate “What you have found out”. If you didn’t find anything out : STOP NOW!
- Most technical reports are intended as communication of new knowledge.
  “I had this hypothesis and I tested it like this; here are my results and this is what we learn from them”
- BUT as a student you are asked to write technical reports about things that you know that the person who reads it (the marker) will already know. Don’t worry – your marker is not your audience (see later) – and your task is still to express what *you* found out.

What Sort of report are you producing?

- Lab Report
- Blog
- Magazine Article
- Essay
- **Technical Report <-** what this lecture is about
- Technical reports may be:
  - Academic Papers
  - Industry “White Papers”
  - Description of a project undertaken

  - Whether they are published on paper or on-line. The rules do not change.



Who is writing this report?

- The convention is to write everything in the third person (objectively, not subjectively)
- This does not apply to Blogs and Magazine articles which are often intentionally subjective
- Can lead to unpleasant use of passive voice. Compare
  - “I did a survey of one hundred web sites to ascertain….”
  - “One Hundred web sites were surveyed to ascertain….”
  - “The author surveyed one hundred web sites to ascertain….”
- Some “expert writers” break the rules – just as some expert artists break the rules.
- You need to **learn now** how to write in the **third person**
- When you are an real expert maybe can break the rules

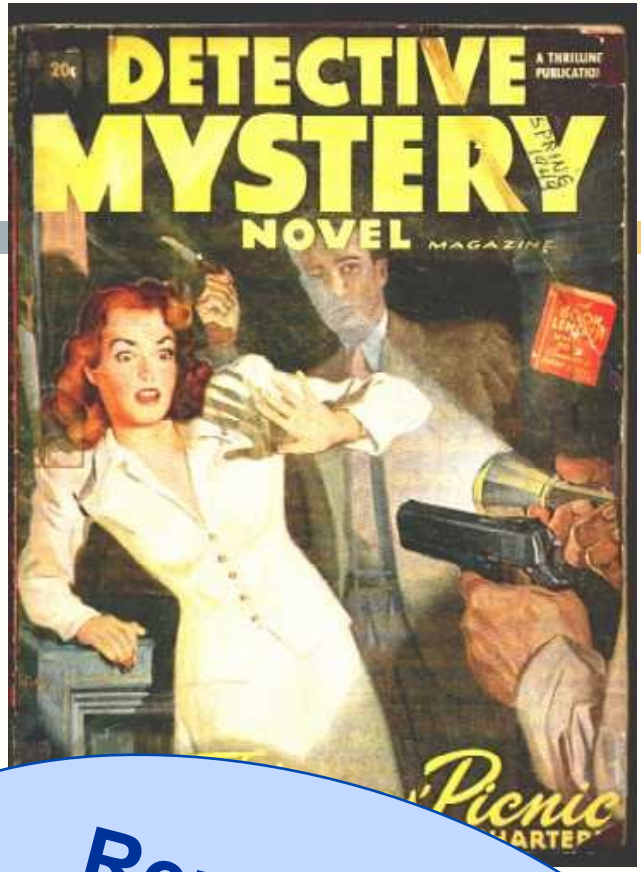
Reports are not personal

With thanks to nataliedee.com

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 (probably not sub sub sections)
- **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**
- **[Web References]**
- **[Bibliography]**
- **[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 – not a précis.
- **IS VERY IMPORTANT**

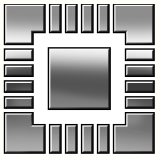
ABSTRACT

Although the cloud of Linked Open Data has been growing continuously for several years, little is known about the particular features of linked data usage. Motivating why it is important to understand the usage of Linked Data, we describe typical linked data usage scenarios and contrast the so derived requirement with conventional server access analysis. Then, we report on usage patterns found through an in-depth analysis of access logs of four popular LOD datasets. Eventually, based on the usage patterns we found in the analysis, we propose metrics for assessing Linked Data usage from the human and the machine perspective, taking into account different agent types and resource representations.

Use four or five sentences.

1. What is the problem, and why is it a problem?
2. What is your idea for a suggested solution?
3. How did test your idea?
4. What results did you get?
5. Why is that useful?

- It's a good idea to write the abstract before you begin (even if you re-write it after you finish)



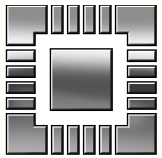
Experimental Report Abstract

- Tea drinkers report major differences in their satisfaction with cups of tea, even when they have been made from the same tea leaves. One possible cause of this variability is the temperature of the water at the time it is poured over the tea leaves. This report describes an experiment in which one hundred tea drinkers were asked their views on teas made with water at different temperatures. The results demonstrate a significant preference for tea made with boiling water. The perceived quality of tea, particularly in the USA, would be much enhanced if caterers observed this convention.

- (5 sentences, 97 words)

An Abstract for a Possible Coursework?

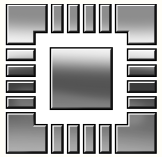
- You've been asked to write a report on Folksonomies…
- Folksonomies are internet based collections of user assigned labels, or "tags", for web resources. There is a debate within the Web Science community as to the importance of social tagging in general, and folksonomies in particular. This report surveys a range of current social tagging systems and distinguishes between true folksonomy systems such as Del.icio.us, which attempt to enhance the classification of resources, and simple tagging systems such as Flickr, which merely improve description. The report concludes by describing some research work in progress to extract semantic metadata from folksonomies in order to improve search engine performance.
- (4 sentences. 97 words)



An Implementation Project Abstract

- Experts in wine tasting like to keep structured records of their tasting notes and a number of well established PC database applications exist for this purpose. However, increasingly applications tend to be web service based applications and many focus on the benefits of social tagging. This report describes the specification, design and implementation of a web based application to store wine descriptions according to a standard ontology, which allows users to enter their tasting notes as tags. The report concludes by evaluating the new features that are facilitated by this novel implementation.

- (4 sentences. 95 words.)

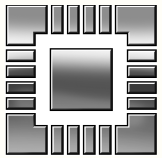


Introduction and Conclusion

- 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, and demonstrate your awareness of related literature. What are your objectives?
- 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.



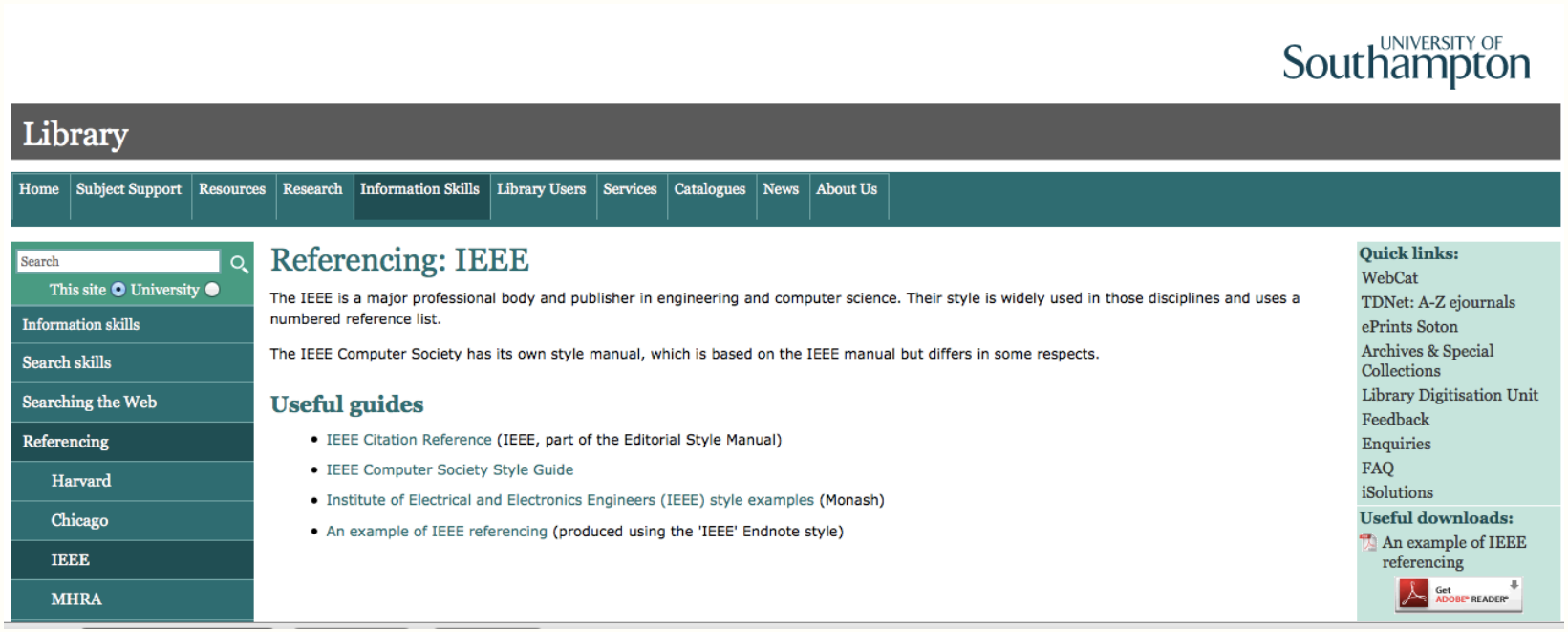
Citations, References and Bibliography

- Learn how to format a reference and how to cite it.
- There are two major formats which you are likely to use or encounter.

- Harvard - Cite with Name and Date
  - Much preferred for technical reports
- IEEE – Cite with Number
  - Much more compact so used is paper based IEEE and ACM journals

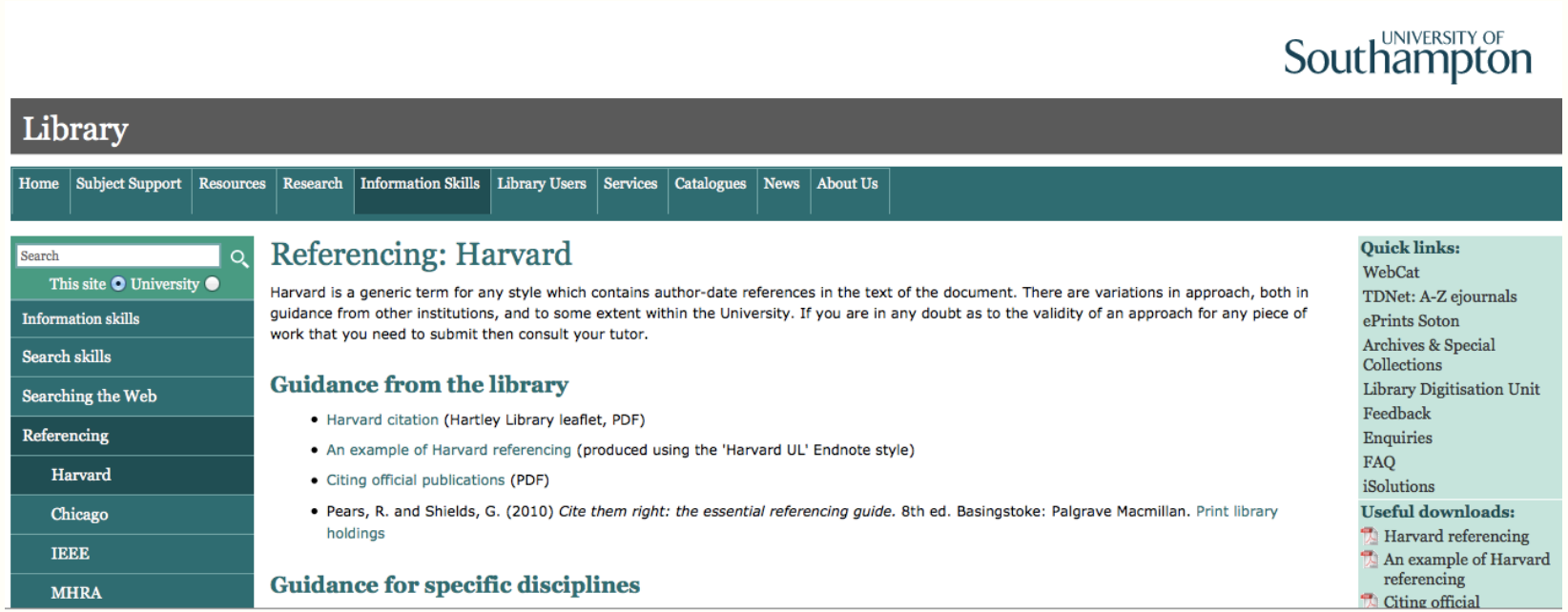
- References are a list of the items which have been ‘cited’ in the document
- Bibliographies are reading lists, that provide more background on the area, but which you have not specifically cited

Citing in IEEE notation



http://www.southampton.ac.uk/library/infoskills/references/ieee.html

Citing in Harvard notation



http://www.southampton.ac.uk/library/infoskills/references/harvard.html

You must usually use IEEE conventions

References

Should provide a replicable audit trail

So…

They need to be complete and in a standard format

IEEE convention

- uses a single sequentially order note number to cite all references to each source mentioned in the text [1].

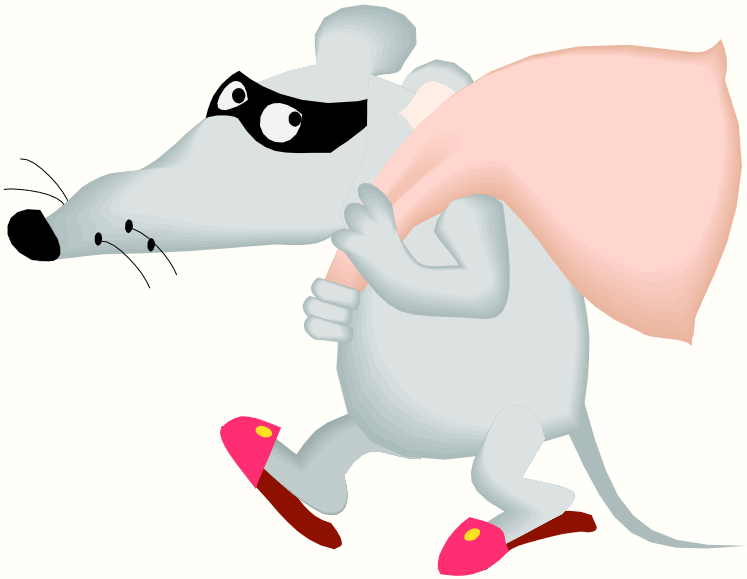
1 http://www.ijssst.info/info/IEEE-Citation-StyleGuide.pdf

Citation On-line and of the On-line

- In these days when
  1. Many of the papers you cite are available on-line
  2. Your paper will in all likeliness be read on-line

  in addition to the normal reference, it is customary to hyperlink your references to the on-line version– making it much easier for your readers to follow.
- A number of sources may only be available on-line. A good rule of thumb is – if you can identify the provenance (author(s) name, and a name for the on-line publication, date of publication) then cite and reference it in the normal way. (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

- In some countries/cultures students may expect to copy
- Teachers may want students to repeat exactly what is in text books or lecture notes.
- At the University of Southampton all work you submit for marking must be your own original creation
- Presenting another's work as if it was your own is called "plagiarism" and is the wrong thing to do.
- **Plagiarism** is what you do when you copy without acknowledging your sources
- There are academic conventions to acknowledge sources
- We have clear university regulations against plagiarism

Avoiding Plagiarism

- 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
  1. We run programs to identify plagiarism
  2. ECS and the University have disciplinary procedures for people identified as cheats.

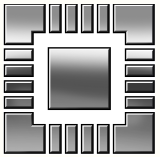
     https://secure.ecs.soton.ac.uk/ug/handbook/0809/SectionA07DM3.doc (section 5.1)

     http://www.calendar.soton.ac.uk/sectionIV/academic-integrity-procedures.html

     If you do cut and paste then you should "quote"
     e.g. As Doolittle (1966), says "the rain in Spain stays mainly on the plain". For quotes of larger than a paragraph, indents are often used.
- See

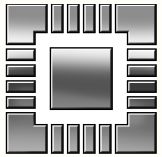
  https://secure.ecs.soton.ac.uk/notes/info1010/resources/AcademicIntegrity.ppt
- When you hand in work or submit a paper to a conference you sign a declaration that this is *all* your own work. If you sign this and then plagiarise, not only will you be cheating but also acting dishonestly

Work through the academic integrity tutorial http://www.ait.ecs.soton.ac.uk/



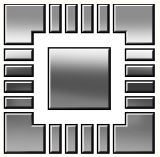
Checklist before you submit

- 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?



Some Links

- Hints on Technical Writing (John Ringwood)
  http://odtl.dcu.ie/wp/1999/odtl-1999-03.html
- Writing Tips – Newcastle Chemical Eng Dept
  http://lorien.ncl.ac.uk/ming/Dept/Tips/writing/writeindex.htm
- Writing Scientifically
  http://www.academic-skills.soton.ac.uk/studytips/science_writing.htm
- Instructions on how to enrol on the blackboard course including academic writing skills
  http://www.academic-skills.soton.ac.uk/toolkit.htm
- Academic Integrity
  https://secure.ecs.soton.ac.uk/notes/info1010/resources/AcademicIntegrity.ppt



Work and improve over time

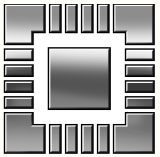
- Have a plan
- Do good work
- Record your work
- Analyse the results
- Capture the whole process
- Meet your deadlines

Some aspects will apply equally to:

- Every written task

Use opportunities to refine your process

these are skills for life



Record an Audit Trail

References

- Provide an audit trail
- Acknowledge others' work
- Are concise

Should be replicable

List references

- consistently,
- correctly,
- completely

They need to be:

complete and in a standard format

They need to contain:

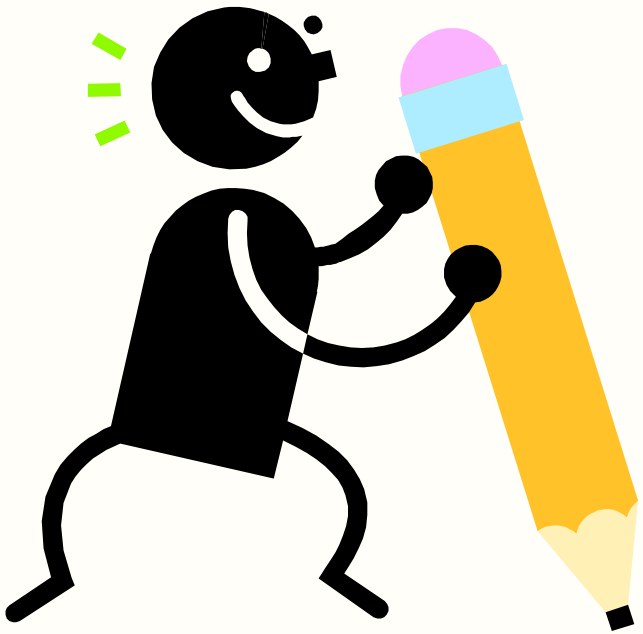
enough detail to locate the same source again

Do not include:

ISBN

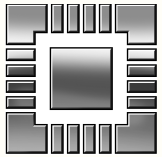
Library call numbers

Work smarter not harder



One touch

- Write your bibliography as you go
- Always get full references
- Record how and when
- Collect to a standard format



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

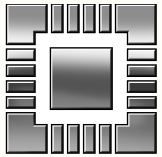
Keep track of your sources

With notes, copies of articles, useful diagrams, etc.,

NB

- Authors, complete name of work, editors if any, publisher, year/ month of publication, volume no., page numbers
- URL plus any clues as to original paper source.
- If class notes, is there a printed textbook?
- If a self-contained paper, look for any and all clues to find the original citation (e.g. author's publication list on Web page).

Activity 3

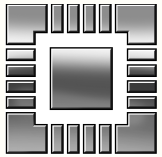


Learning and help

- We will each need different kinds of help
- We each learn and work in different ways

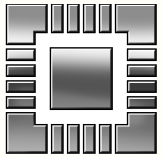
Learning by doing
(read and write - lots)

- Language Support
- Learning Differences Centre
- Assistive technology centre
- Self help (books, guides, the web)
- Peer help (colleagues, friends)



Important Guidelines

Some details of what
you have to know



presenting results 1

- what's 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

So what exactly is figure 1?

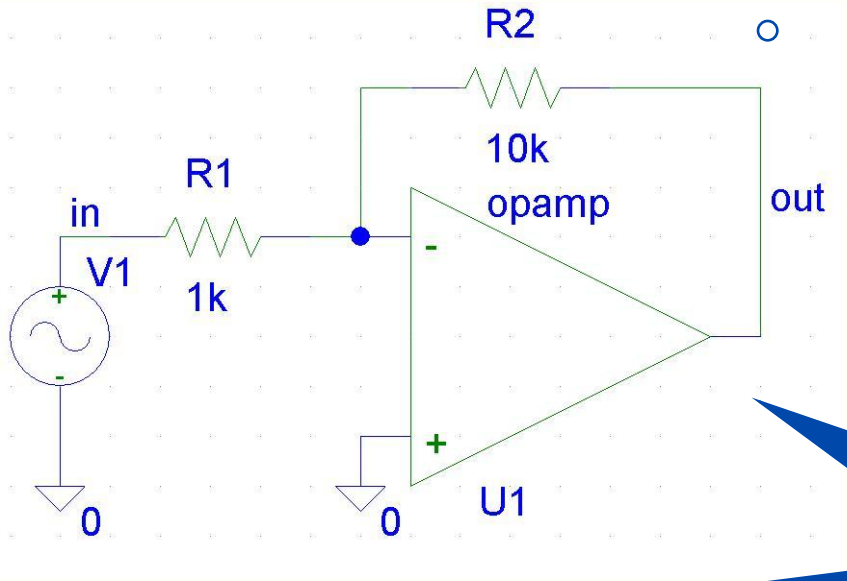


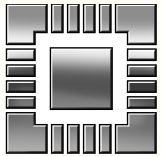
Figure 1

If you know tell me PLEASE

- ✓Use Labels
- ✓Speak the maths

presenting results 3

- 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 labelled to form a cross reference
- Can the reader find all your results easily?



Design of figures

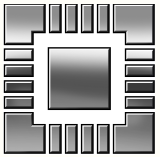
What needs to be in a graph?

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



citations and references (again)

there are standards...

You are expected to use numeric referencing

- use that single standard throughout your report

- ensure that all your references are complete – could a reader go to the source unaided?
- some tools enable automatic formatting of citations
  e.g.: endnote and bibtec

Revision

Reread it

Imagining yourself as the audience.

- Does information come in the right order?
- Are all parts present?
- Is it complete?

NB: See notes for extra help

Review, Revision and Proof Reading

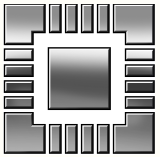
WHAT:

Check systematically for errors of any sort in a document

HOW:

Read through more than once, each time checking for a different type of error

Use friends to help in this process

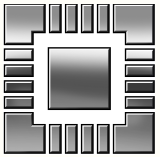


Further work

- This class was just one of many beginnings
- Its up to you now to do the work
- Over the next week look at your action list – and initiate the actions!!
- Whenever you write remember what the process is about

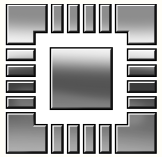
Learning is a continuous process

- Train yourself ;-)



Recap on links

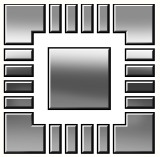
- The Student Portal SUSSED has links to library, academic skills and student resource network http://sussed.soton.ac.uk/
- Electronic Journals and other online academic resources via the Library http://www.soton.ac.uk/library/
- Academic Skills Web Site http://www.academic-skills.soton.ac.uk/
- In particular look at the guides entitled
  - “Developing your Academic Skills”
  - “Gathering information and Using the Library”
  - “Referencing your Work”



Appendix

This part of the slides contains basic advice on style and grammar

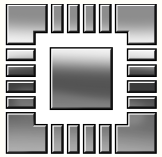
It also contains exercises to go with the presentation which you can also complete right now



Writing and study skills

- **General University guidelines on academic skills**
  - *Topics include:* independent learning, your learning style, getting the most from lectures, reading academically, writing effectively, writing your dissertation, search strategies, bibliographic software, referencing your work, working in groups, giving a talk, preparing for exams.
    See http://www.academic-skills.soton.ac.uk

    Guidelines on spelling and punctuation, with exercises (the Aries project)
    http://www.arts.gla.ac.uk/SESLL/STELLA/ARIES/



Style - 1

- Use the third person
- Passive voice:

  "The transducer was calibrated…"
- Neutral, informative tone
- Avoid colloquialisms:

  POOR:

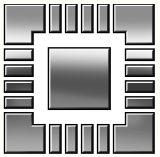
  "The final design was brilliant!"

  GOOD:

  "The final design had the best signal-to-noise ratio"
- Be specific; refer to figures by number, not pronoun
- Be concise

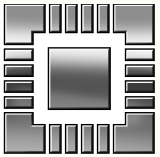
  Can you use more shorter sentences?

  Can you say it in less words



Style - 2

- Use figures, diagrams, equations when they’re more concise and accurate than words would be
- Choose figures carefully;
- make points not decoration



Style - 3

Use standard mathematical notation;

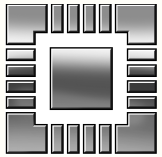
- variables should have a single-character name
  - POOR: Imp = V/I
  - GOOD: Z = V/I
- Define variables
- specify units
- Use SI units

Capitalize and space numbers and units correctly:

6 kHz **not** 6KHz

50 mm

8.3 μFd, 60 dB **not** 60 Db



A bit about grammar

- 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?"

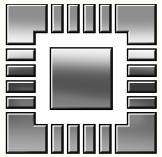
  POOR:

  "Being as how it crashed."

- Watch for tricky subject-verb agreement:

  "The set of numbers is…"

  "These data are…"



A bit more about grammar

Avoid ambiguous pronouns:

"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…"

Examples 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 [4,5,6] and subsequently by Storey et al [7]

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. (1984)…

6 Stone, M. (1989)…

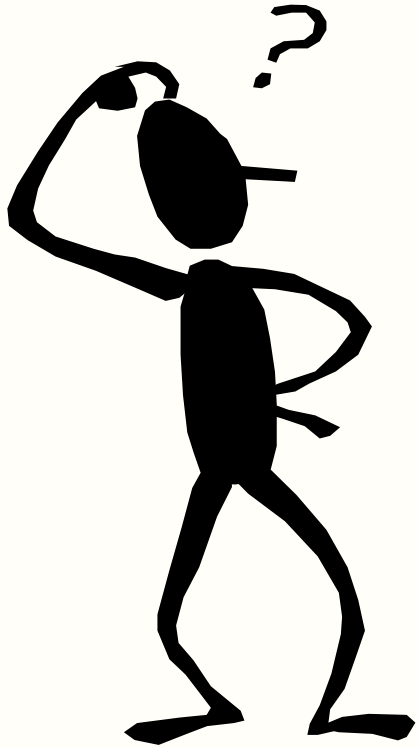
7 Storey, M., Stone M, and Smith, P. (1992)…

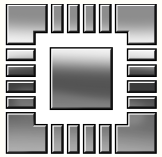
How can you build on this lecture?

Think again!

- 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





Conclusions and reflections

What are you going to take away?

conclusions reflection

- learn by doing

reflection

think about the issues raised today

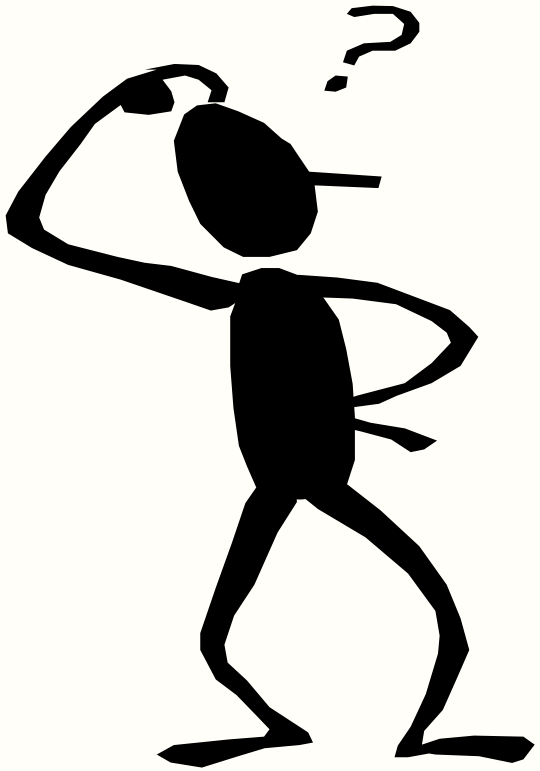
Are there any questions?

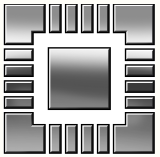
Think about the skills you need to develop

Reminder

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

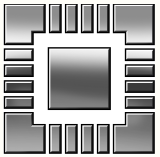
- Write down a list of three aspects of writing skills which you think that it is important you improve





acknowledgments

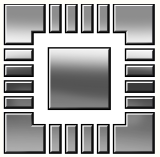
- Parts of this set of materials were drawn from related examples drawn up by colleagues particularly Hugh Davis, Christine Shadle, and Peter Gregson, with guidance from Simon Cox
- I have also drawn from materials at the University of Toronto's Centre for Engineering Communication



References

- For background and related material and references please see the courses page
  https://secure.ecs.soton.ac.uk/module/1213/ELEC6021/resources
- Notes specific to this lecture are at EdShare

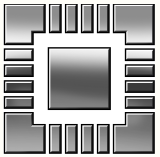
http://www.edshare.soton.ac.uk/3451/



my details

Dr Su White

- saw@ecs.soton.ac.uk
- +44 (0)23 8059 4471
- http://www.ecs.soton.ac.uk/~saw



Further Reading

- See the set of notes in EdShare
- **http://www.edshare.soton.ac.uk/3451/**