The Three R's of Research: A Tutorial

Reading, wRiting and Reviewing

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Overview

- ★ Reading
  - ★ the importance of reading well and reading large volumes quickly
- ★ Writing
  - ★ hassle-free simple steps to improving your papers
- ★ Reviewing
  - ★ the review process and tasting your own medicine
- ★ Making it work as a combined synergistic research process
- ★ *Presenting my **opinions**, I want to hear from you too!*

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Why am I telling you this?

- ★ Something I often rant at my students, other people's students and (occasionally) just people on the street
  - ★ Not always obvious how the three are linked
- ★ Very simple to improve speed, quality and efficiency
  - ★ especially when it comes to writing up with pressures of time and money
- ★ The core skills fundamental to *any* research
  - ★ "you read for your degree" - Dr. Chris Bowmer
- ★ Getting the synergy can make a vast improvement

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In-line with PhD structure

- 1st year: *Reading*
  - asked to familiarise with a massive amount of information
  - requires good reading skills at a rapid pace
- 2nd year: *Writing*
  - ‘my first paper’
- 3rd year: *Reviewing*
  - asked to do reviews on behalf of your supervisor
  - review your own work in preparation for journal and thesis submission

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Reading papers efficiently

Structured reading leads to faster
reading and better information retention

But I know how to read!

- ★ The average PhD student in science will read in excess of 400 papers throughout the duration of their PhD
  - ★ lots of information to take in and manage
- ★ Reading papers which are not exactly on topic or from a different domain/field and can be boring!
  - ★ e.g. lots of highly domain-specific immunology
- ★ Bulk of reading performed in first six months
  - ★ not yet up to speed with essential research skills
- ★ Reference management an entire tutorial by itself!

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Reasons for reading a stack of literature

- ★ You have to become the expert in your field
  - ★ make an original contribution
  - ★ have to know who has done what, when and with whom
- ★ The recall of this information becomes critical!
  - ★ *“have you read the paper of Dr. Xyz et al on your very topic??”*
- ★ A lot of paper which you download will be irrelevant
  - ★ its confusing as to what you ignore and what you need to keep
  - ★ can’t always tell from the abstract what it in a paper!

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Strategies for getting through the volume

- ★ Try and read everything about your topic?
  - ★ since “google scholar” et al, there is almost too much information!
- ★ Be selective about what you read?
  - ★ start with review papers, but be careful *(why?)*
  - ★ focus on the major publications, but you could miss something....
- ★ Only read the papers your supervisor suggests?
  - ★ who’s to say your supervisor is some kind of research god?
- ★ Develop a strategy or process for systematically reading papers
  - ★ save time and saves your sanity

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IMO the fatal mistake

- ★ I avoided this more by accident than by design!
  - ★ I didn’t want to read all the papers all the way through as I got bored
- ★ Linear: start reading a paper at the abstract and don’t stop until you hit the acknowledgements section
- ★ *Passively* reading papers in this style
- ★ Complete read of a paper would take a 1st year 3/4 hours
  - ★ 3 * 100 = 300 hours = 10 full on working weeks
  - ★ without doing anything else which is unrealistic
- ★ Make it into a game...

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Adaptable strategies depending on purpose

- ★ Initial familiarisation with a field
  - ★ requires examination of the background sections of papers
  - ★ chase down the citations and then the citations in the citation etc
  - ★ quick look at the conclusions and future work
- ★ Looking for specific pieces of information
  - ★ don’t print it out, this makes it very tempting to read the whole thing
  - ★ make use of the fact that electronic documents are easily searchable
- ★ *These are slightly more unusual cases, so what about the general purpose paper read?*

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My strategy for getting through a paper

- ★ And by my, I mean the strategy that I was taught as a UG
- ★ In this order (I'll explain why in a second):
  - ★ introduction
  - ★ results
  - ★ methods/algorithms/tools
  - ★ results (again)
  - ★ conclusions
  - ★ background
  - ★ the rest

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What this means in context

- ★ Never judge a paper by its title
  - ★ the key to a paper is usually in the introduction not the title or abstract
  - ★ last paragraph of introduction always states the contents of the paper
- ★ Leave the maths until the second read through
  - ★ unless you are from maths that is
- ★ Skip next to the results section (if its an experimental paper)
  - ★ what have they done and what was the outcome
- ★ Check their methods which can make more sense if you know what the outcome is

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What this means continued...

- ★ Take a second look at the results and make assessment
  - ★ do they match what is given in the introduction and methods?
  - ★ in bad papers none of this stuff will match up properly
  - ★ hard to see if you're just passively reading
- ★ See what they conclude
  - ★ do you agree?
- ★ Use the background section to find out more information or to clarify unfamiliar terms
- ★ *Lets try it, over to you*

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Writing well

Saying what you mean and meaning what you say

Fundamentals of communication

- ★ Majority of scientific communication is written
  - ★ lucky for me its in English!
- ★ Irrespective of your native language, writing can be hard
  - ★ technical writing is very different to standard written english
- ★ Technically getting the formalisms is difficult
- ★ Writing not just what you think you mean, but what you actually wish to convey
  - ★ English vocabulary and grammar can confuse and obfuscate

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Getting started can be the hardest

- “Fear of the blank page”
  - so just write anything!
  - write why you cant write anything
- My strategy is a bit unusual and old school
  - I hand write out a first draft of practically every document
  - not very good at proof-reading!
  - better quality as have gotten a proof-read for free when typing up
- Don’t be afraid to double line space and edit on paper

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The best ways to improve your writing

- ★ Read material written by good writers
  - ★ ask for recommendations initially
- ★ Practice does make perfect
  - ★ dont expect to be able to write like a pro in your first year
- ★ Get out the school books and understand the differences
  - ★ a vs the
  - ★ that vs which
  - ★ effect vs affect

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Clarity is the key

- ★ Simple english is usually the best english
  - ★ e.g. use vs utilise ; method vs methodology
- ★ Avoid long sentences!
  - ★ a sentence has run away from you if it is more than two lines long
  - ★ same with massive paragraphs as it disrupts structure
- ★ Use colons and semi-colons only if you really must
  - ★ nothing wrong with a well placed semi-colon, but they are difficult to use appropriately and its easy to misinterpret
- ★ Get to the point with **power sentences**

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This all seems like a lot of effort...

- “Writing for Computer Science”
  - Justin Zobel
- Having mediocre conference paper reviews
  - I just couldn’t get across what I wanted
- Power sentences, shorter sentences and more effective planning of sections made a big difference to my writing
  - best paper awards and nominations
  - helped me pass my viva
  - better presentations as I can get to the point quicker

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The dark art of peer reviewing

Reviewing for others and for yourself

The peer review process

- ★ Highly necessary process of the review of publications
  - ★ assesses their quality and suitability for the target conference/journal
- ★ So many bad reviews given by competent people
  - ★ not “bad” as in “your work is rubbish”
- ★ Poor quality reviews are ones which don’t say anything
  - ★ “isn’t your paper wonderful” style of review
  - ★ the two line review - “its crap”
- ★ Its very frustrating to receive these reviews!

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When you get to review a batch

- ★ Make yourself an evaluation criteria
  - ★ some publications have their own criteria
- ★ Read the paper using your strategy
  - ★ make notes as you go along of anything which seems inconsistent
- ★ Double check your inconsistencies
  - ★ trust your instincts on this but be **fair**
- ★ Try and compare the submissions against each other if ‘marks’ are required for different components
- ★ Get a mate to double check the maths if you’re unsure

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Things to put in your evaluation

- ★ Does the paper satisfy the claims made in the aims?
- ★ Does it make sense
  - ★ logic presented
  - ★ way it is written
- ★ Is it technically correct?
  - ★ spend some time checking it out for content and writing
- ★ Is it well written and are sections structured correctly?
- ★ What can be improved?

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For journal paper reviews

- ★ Make sure that you have sufficient time on your hands
  - ★ it can take 2/3 working days to properly write a review for a 50 pager
  - ★ dont say yes if you’re busy
  - ★ if you dont have time in the next 3 working days to do the review then **simply say no!**
- ★ As with conference papers make yourself an evaluation criteria
- ★ Be prepared to have to continue this review process through several iterations with the authors for journals
- ★ Make notes as you go along especially with large papers

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The most important thing...

- ★ Do it properly or just don’t bother!
  - ★ no one likes to get a pointless review, so don’t give them out!
- ★ Be a fair reviewer
  - ★ point out the faults in the paper
  - ★ if there is good stuff there be encouraging about it
- ★ Don’t worry about making a mistake
  - ★ there are usually at least two other reviewers
  - ★ good editors will check all comments before passing them on

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Putting it all together

- ★ Write your paper and try to make it as clear as possible
  - ★ use power sentences wherever possible
  - ★ keep it short and snappy
- ★ *Make* the time, put it down for a few days
  - ★ so you can step back from it
- ★ Pretend its not your paper but one you are reviewing
  - ★ read it using your strategy - is it confusing??
  - ★ mark your paper against your own evaluation criteria
- ★ Repeat this process until you feel it is ready for submission

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In summary

- ★ Teach yourself to read again
  - ★ know why you are reading a particular paper
  - ★ develop a strategy for reading a large volume quickly
- ★ Understand what you are writing
  - ★ keep it simple, make it clear
- ★ Writing good reviews
  - ★ read thoroughly and present a balanced argument
  - ★ take the time to do a proper job, else just say no
- ★ Apply the review process to your own writing

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Most importantly, enjoy the process

Questions and comments?

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