Get Ready: Academic Writing, General Pitfalls and (oh yes) Getting Started!

March 20, 2014

1 Academic Writing

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Do's…

- Do conduct a sufficient amount of research. Do a fully packed 7 months, and more if you need more time to complete! Balance the effort across all the elements of the thesis from preparation, orientation, modelling, analyzing, validating, tool development, writing, etc! Make sure that the research conducted fits in with the requirements.

Do's...

- Do plan and organize as you go. Don't make the mistake of writing your thesis with little thought of its direction. Work out what you want to achieve academically and in terms of research impact and plan that in while reviewing progress regularly. Organize your sources into background information, supporting arguments and opposing arguments, then present your theoretical approach and your research methodology, then application and verification, then analysis and results based on validation, then reflect and conclude.

More Do's...

- Do write a strong thesis hypothesis that will be able to carry the supporting arguments. A thesis statement should be broad enough to cover the supporting arguments but narrow enough to bring focus.

More Do's...

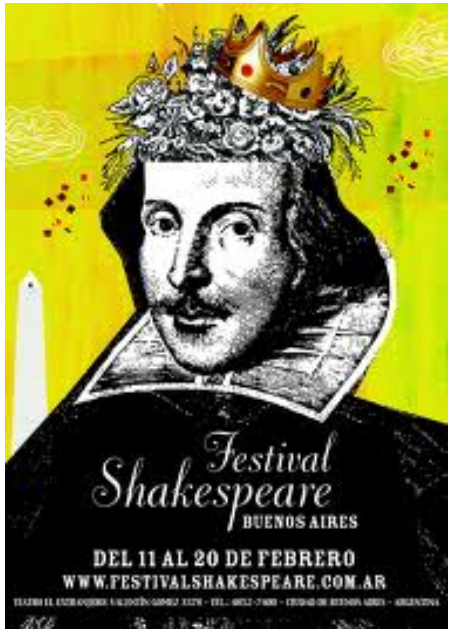
- Do follow thesis/paper instructions. Many students will make the mistake of not following their professor's instructions. Most professors will guide you on basic issues of length, etc but they will also say things that they think are important and if you do not listen, remember and implement you may not use specific advise that is critical to them. Follow their instructions precisely and even ask for clarification to be sure on what actions they want you to take.

More Do's...

- Do validate your opinions, theoretical basis and eventual models or tools. Unless specifically instructed, do not leave your opinions unsupported by research. Writing a thesis or research paper shows that you know exactly how to substantiate your claims. Prove it, like as if you were going to court and you need to provide evidence!

Don'ts...

- Don't make simple and inconsistent writing mistakes. Do not add new points in the conclusion. Remember, the conclusion is a wrap-up. You are acting as a guide and the reader should not be confused by a new point when what is expected is a wrap-up. Do not present figures, graphs and illustrations but not tell the reader why. Be careful with acronyms and jargon! No amazingly long sentences or whole sections of many very short factual statements.



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Don'ts...

- Don't forget to proof-read your writing. Apart from poor spelling and grammar your brilliant ideas are wasted if the exam committee has a hard time reading it. Your teacher will end up feeling frustrated by spelling errors and take his/her frustration out on your grade. As a good friend to read it quickly and to be critical of the overall package! Ask your prof if there are any serious gaps and issues.

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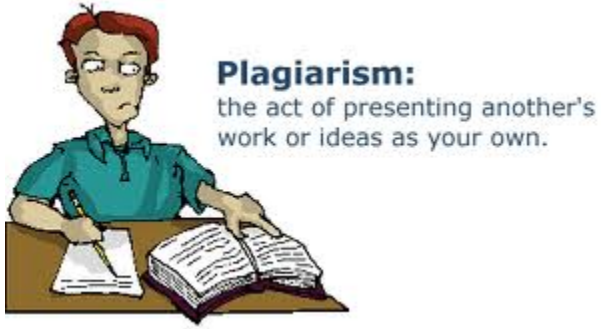
Don'ts...

- Don't plagiarize. This mistake can be deadly. Remember always cite your sources both in-text and in the bibliography. Most style manuals will give you exact instructions on how to cite sources and write up the bibliography or works cited page. Remember to also be good at referencing the most relevant work, rather than not knowing about it or including it.



Literature Review

- Divide your initial search up into keywords associated with your hypothesis (specific theory, particular application, wider topic, general field, supporting general theory, etc)
- Search on higher quality search machines such as Webster, ISI rated, professional organizations (AIAA, RAeS, etc), google scholar, etc.
- Read abstract, scan paper and get ones that seem to be promising. Look at references in best papers to use their references, up-to-date being most important!
- Write a simple line of what the paper's main contribution is and then you can group a number of papers into a block that you can use to explore the state-of-the-art in a certain area.
- Always summarize or synthesize at the end at least in order to add your interpretation clearly, while also linking it you your research hypothesis and objectives.

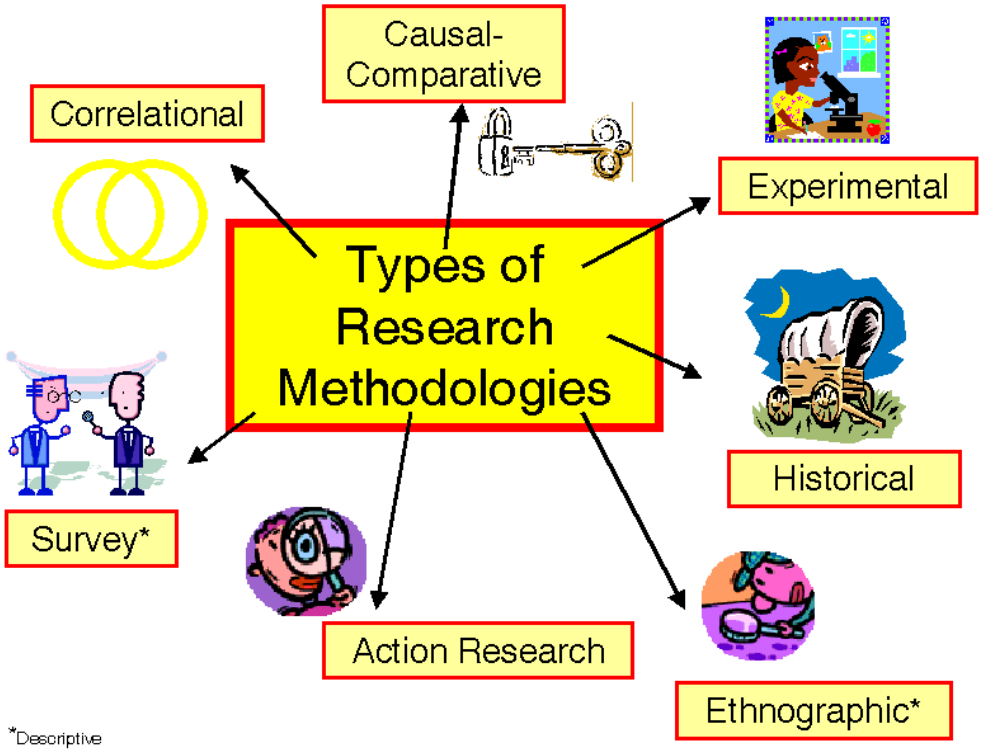
Practically….

- Write anything with a view to re-using it:
  - MOP/Lit. Review
  - Kickoff/mid-term/green light reports &review
  - Industry presentations and reports
  - Manuals
  - Papers
- Make a draft skeleton of the structure with your prof first
- Put sections together, iterate on core content and more general overview to get it right first time!
- Make it as accessible as possible in terms of text, layout, structure & headings, graphics, conclusions, abstract, etc.

2 General Pitfalls

Not knowing what you are doing!

- What research methodology are you using and what is needed to deliver that at the highest quality?



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Is it basic research?

Basic (aka *fundamental* or *pure*) research is driven by a scientist's *curiosity* or interest in a scientific question. The main motivation is to *expand man's knowledge* , not to create or invent something. There is no obvious commercial value to the discoveries that result from basic research.

For example, basic science investigations probe for answers to questions such as:

- How did the universe begin?
- What are protons, neutrons, and electrons composed of?
- How do slime molds reproduce?
- What is the specific genetic code of the fruit fly?

- Most scientists believe that a basic, fundamental understanding of all branches of science is needed in order for progress to take place. In other words, basic research lays down the *foundation* for the applied science that follows. If basic work is done first, then applied spin-offs often eventually result from this research. As Dr. George Smoot of LBNL says, "People cannot foresee the future well enough to predict what's going to develop from basic research. If we *only* did applied research, we would still be making better spears."

Is it applied research?

Applied research is designed to solve *practical problems* of the modern world, rather than to acquire knowledge for knowledge's sake. One might say that the goal of the applied scientist is to *improve the human condition* .

- For example, applied researchers may investigate ways to:
  - improve agricultural crop production
  - treat or cure a specific disease
  - improve the energy efficiency of homes, offices, or modes of transportation
- Some scientists feel that the time has come for a shift in emphasis away from purely basic research and toward applied science. This trend, they feel, is necessitated by the problems resulting from global overpopulation, pollution, and the overuse of the earth's natural resources

Or a bit of both (know what your aim is).

- The distinction between basic and applied research isn't always clear. It sometimes depends on your perspective or point of view. "*How long will it be before some practical application results from the research* ?"
  - If a practical use is only **a few years** away, then the work can be defined as strictly **applied** research.
  - If a practical use is still 20-50 years away, then the work is somewhat applied and somewhat basic in nature.
  - If a practical use **cannot be envisioned** in the foreseeable future, then the work can be described as purely **basic** research.
- For example, for some time now, a fair amount of research has been underway on developing fusion reactors to provide a controlled energy source for cities. There is a clear applied goal to this work, yet there are so many technical obstacles to overcome that it may be another 30 to 50 years before we see a functional fusion reactor in use. The development of fusion energy could be regarded as both basic and applied research.

Not knowing what your prof wants!

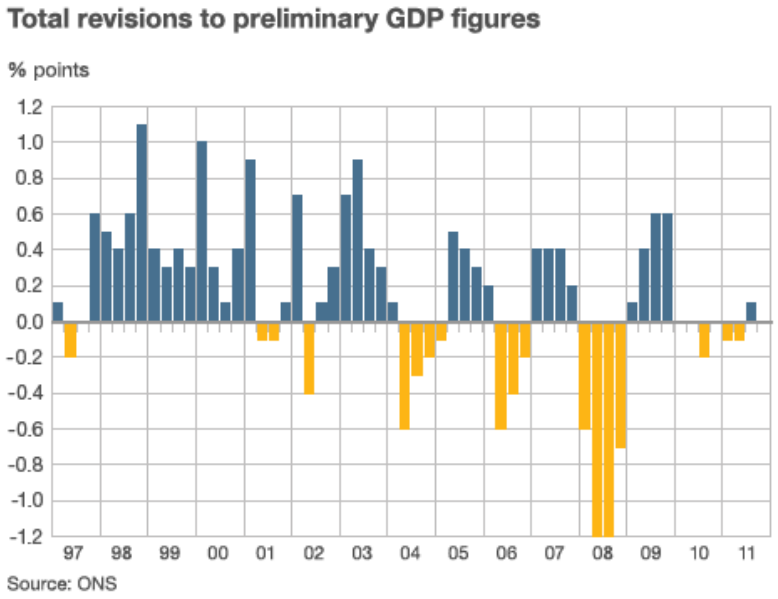
- Applied or basic, quick and dirty or slow and methodical, money is no object or commercially viable, blue sky or bang for buck, high quantity-low quality or vice versa,.....

Not knowing how you should do it!

- Planning (what and when), methodology, agreements, team members, expectations, deliverables as well as goals?

Being too optimistic or vice-versa!

- What is realistic? Listen to those around you? Look at your performance relative to your Gantt! Be reflective!



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Not doing it only your way – listen to others!

- Don’t make a Sid Viscous of yourself and die in the process, but Keith Richards works well when your really good!

3. Getting started!

Step 1

- Talk to your prof (NOTE: leave your agenda behind or at least indeed make it clear if you can’t let go of it!)

Step 2 etc

- Follow what your prof recommends on all subsequent steps!

Last step!

- Reflect on what you have experienced, the knowledge you have developed and the learning outcomes, both soft and hard, and go on to use your Masters as a passport to continued development and success,; all augmented through your understanding of the importance of research quality, as relevant to many activities!

"What we are today comes from our thoughts of yesterday, and our present thoughts build our life of tomorrow: Our life is the creation of our mind.“ Buddha

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Then you walk the walk!

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