Myths in research degrees
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The pursuit of a research degree is fraught with myths. Be wary of the following (and undoubtedly other) urban myths that might come your way.

1. **Your supervisor won’t let you fail.**

   As tempting as it might be to be lulled into believing this tale, it is bound up in falsehoods about responsibilities and roles.

   The job of the supervisor is to assist students to reach their potential. If the admission criteria are correct, and the student motivation level is sufficient, that ‘potential’ will be adequate for successful completion, but much work will be required.

   Each student must work to read the literature, identify the gaps in knowledge, and establish and follow through an appropriate methodological research journey. In Science projects, for instance, this might involve the creation of a hypothesis, the identification of objectives, the design experiments to fulfill the objectives, the collection of data to test the hypothesis. In Education, for example, this might mean a more open ended ‘bottom up’ approach where an open question is established that is relevant to the broad area of the problem in focus, data are collected such as through interviewing, observation and journaling. Whatever the project the work will involve analysis and interpretation of the data, critique of the research followed by setting it into context with the literature, and showing how knowledge has been advanced by the research.

   The supervisor must work to ensure that the student has a well-considered project, which can be completed within a given time frame, and tuition in a wide-variety of practical approaches to fit the student for a research career. There must be a commitment from the supervisor to involve the student in all aspects of the research process, which may include the initial hypothesis or research questions, designing and executing experiments or other methods of data collection, communicating data at meetings or conferences, and writing research papers for publication – training the student to analyze, synthesize, critique and interpret.

   The supervision process has evolved to create independent researchers. If the supervisor assists all students to complete successfully (regardless of ability, focus, commitment, growth, progress and so on), not all completed students will be independent, what is understood by a ‘research degree’ will be changed, quality will decrease and the achievement of good students will be diminished.

   It is the supervisors’ sacred trust to maintain standards.

2. **Three replicates are sufficient**

   This myth rests within the world of science rather than social science - so scientists beware.

   The number of replicates needed for statistical analysis of data depends upon the variability of the samples and the size of the effect that the imposed treatments have. When the variability of samples is high and the treatment effects are small, a large number of replicates may be required to give confidence. This is particularly the case in the biological sciences where ‘natural variability’ is high due to differences in gene expression, even when apparently uniform material has been selected for the experiments. Increasing the number of replicates increases the confidence that the results obtained are likely to be wrong less that one time in 20 ($P<0.05$).
In Education, replication perhaps takes on a slightly different meaning. Replication studies are not appropriate in doctoral work at all.

3. **Modelling will mask the errors**

Again this myth is one for the scientists …

Rather than increase replication, there is an increasing trend to use ‘modelling techniques’. Models are only as good as the data used to create them. Inadequate data results in models which have limited application. Computers are now so easy to use that the temptation to find a model that fits the data, whether or not the model has any biological meaning, is strong. Further temptations are to use part of the data set to test the created model: the model usually predicts the data sub-set quite well. Validity, of course, is the question. A rigorously tested-model with biological meaning may revolutionize understanding, predictability and approach – but work will not have been reduced. Hence a model should be an adjunct to research, synthesizing data and making it ‘usable’, not a replacement to fill in patchy data. Correlations may demonstrate an empirical relationship but must not be used to imply cause and effect. Being able to introduce mechanisms increases the value of the correlations. Models may confirm mechanistic assumptions or suggest mechanisms of observed empirical relationships. Notwithstanding the previous comments, the experience of creating a model can be a useful one as a chapter in a thesis.

4. **You don’t need to justify your methodology.**

Not such an issue in science where quantitative statistical analysis is the norm, but in qualitative research it is vital that you have chosen the appropriate methodology for your research question. The match between the ‘what’ of your research (your question or problem) and the ‘how’ (your methodology) is absolutely vital. Theses are judged on the ‘what’ but also the ‘how’. In methodologies using methods beyond the statistical methods found in science, students must be clear about their theoretical perspectives, the methodologies and the methods selected in terms of the research question. Where a research plan creates a blend of methodologies or a phasing of different approaches within an overall project, these choices need to be made explicit and justified to the reader.

5. **Computer-based searching will give you the literature**

Again this might be tempting … but finding the literature is a far more complex task than merely searching the web.

Computers and databases have revolutionized our ability to search for literature. In theory, we can now find all relevant research papers relatively quickly. However, computer searches reflect the abilities and understanding of the person doing the search. An uninformed searcher will not have the expertise to identify the relevant literature. Furthermore, the uninformed person will not have the ability to identify themes by synthesizing the literature, nor analyzing and critiquing the literature. Computers cannot substitute for understanding, they merely reduce some of the labour involved in searching through journals. A good literature review will involve paper-chasing. That is, finding a good research article, reading it, identifying potentially useful articles in the reference list, finding and reading them, looking at the reference lists, finding more articles and so on. You should never refer to an article without reading it yourself … never ever …

6. **Secondary sources are acceptable**

Secondary sources are not acceptable, nor is quoting from abstracts or text books. What you write must be accurate. You need to check out each reference for yourself. Do not trust the views of others. They do not necessarily interpret nor critique in the way appropriate to your
work. Furthermore errors might be within and you will not know unless you consult the source yourself.

To ensure accuracy, you must check the original source. Secondary sources give the interpretation of that author, which may not be the same as the original author intended. In text books the information is synthesized and presented for an audience, which is likely to be less informed than the peer group for whom the original article was written. As a consequence, at least some of the nuances and detail may have been lost. The only way you will know what has changed is by going to the original. Similarly, abstracts are by definition ‘brief statements of content’. Brevity can lead to misinterpretation. Therefore the whole paper should be read for context. The benefit is finding references to other useful work, as well as the insights of the paper itself.

7. Publications before the 1980s are irrelevant

A clear indication to an examiner that a student has used electronic means to create the literature review is a reference list that starts in 1973 (when CAB abstracts start) or whenever the electronic data-base goes back to. Research began very much earlier than this. Galileo, Newton, Aristotle – they all had some good things to say. The biological trials in Britain started in 1840 – and were replicated.

Great work in Education is found within early educational philosophy – in works like that of Rousseau. The work of Vygotsky (1978) is still heralded today as having profound influence on what we know about the connectivity between language and thought.

We all know that we, as researchers, stand on the shoulders of giants. The wise researcher that makes sure nobody has trod the same path. It is disappointing to find out at the end of your research that you were actually standing on somebody’s feet. Furthermore, it is disappointing for a referee or examiner to have to say that the work is not sufficiently original for acceptance.

8. Spellcheck obviates the requirement for proof reading

There are many theses which disappoint examiners simply because the student has not put enough wait on the importance of checking their work. The main thing is to give the examiner a sense of reassurance and is dependent upon detail and ensuring that your spelling is right. Tails of whoa are many. Be warned and read what you have written with care.

Consider the above – nothing has been underlined in red except the word ‘spellcheck’ itself. Thus, beware of spellchecks that promise all but deliver confusion and thwart meaning as well as elicit sloppy work.

9. Advice on research from other students is reliable

Research students are in an apprenticeship during which they work towards independence. This independence is rarely achieved during Doctoral studies which is why, particularly in science, postdoctoral studies are encouraged.

Supervisors, in contrast, have been through the apprenticeship process and, in many cases, have helped apprentices become independent researchers through the process of supervision and working with postdoctoral fellows.

Think about it.

However well-meaning advice from other students is, and however badly you want the advice to be right, if it conflicts with that from your supervisor, do not heed it until you have sought a third opinion. There are students who have failed to complete because they listened to the advice of the inexperienced but enthusiastic.
Who knows most about the discipline and what it will takes to make an original contribution? Who knows most about your academic capabilities? Listen to that person and act accordingly.

10. If you know what you mean, your supervisor will translate

Unless you are planning to spend the rest of your life working with your supervisor, and have reached an agreement that your supervisor will be your translator for the rest of his or her natural life ...

Clearly this is not a sensible way to proceed. Independence must be sought. Doing a research degree is partly an exercise in learning to write – better that ever before. This means that you need to sort out what you mean before you give the draft to your supervisor. Writing is an excellent way to think. By writing we come to know that which lies below the surface. So write as often as you can. Learning to write (better) occurs through writing.

In order to write clearly, plan what you need to communicate in advance. Identify the skeleton of your chapter or article or report, including the points in a logical order and only those factors required to get you to your conclusion logically. Be precise and concise. If in doubt, ask your supervisor if you can work ‘paragraph at a time’, building up your chapter and so on, and incorporating lessons learned at each step. This can be a very much more positive (for both parties) way to approach a task than submitting your magnum opus and having it returned in red ...

If you have had difficulty with writing in the past, make sure you enrol in one of the postgraduate writing courses offered by your tertiary institution. Do this as soon as you become involved in postgraduate research, then you can practice writing through out your time as a postgraduate student.

11. As long as you work hard in the last six months, you will be OK.

Research takes hard graft. Although there are stories about people doing PhDs in six months*, they are few and far between. For most of us a PhD will require time gathering data, analyzing, interpreting, and then more data gathering. In the biological sciences, seasons, plant and animal growth (invariably slower than desired) impact. It is not possible to do spring measurements more than once a year. If you need three years’ spring data, and can’t afford a trip to Britain to mimic the trial, you will need to be gathering data for three years. In other disciplines research approaches may involve collecting data over prolonged periods with persistent observation. Open ended questions and emergent designs mean that analysis takes time. Ideas anew do not come quickly but usually take much reflection and processes of analysis are often iterative rather than linear. Do not leave your work until the end … it will be overwhelming but more importantly compromising in terms of your research journey, the research outcomes and the success of your thesis.

*Apparently the person became bored with what they had done, brilliantly, in the first two years, so they invented a new sort of mathematics in six months – judged to be a significant contribution to knowledge in the discipline. Recommended only for near-genii.

12. Data analysis and writing can be left until the end

This is the sad story of the masterate that turned into a Postgraduate diploma and the PhD that turned into nothing. In both cases the students were convinced that they knew what their data were telling them. In the case of the masterate, when analysis eventually occurred, the student was devastated to discover that none of the treatment effects in the first experiment were significant. An erroneous trail had been followed for the rest of the research.

In the case of the PhD, the student procrastinated, was certain progress was fine, got very muddled, became swamped by not knowing what he had done, didn’t know where to start… and eventually didn’t finish.
Before starting on your next piece of research, analyze and interpret the last part. This does not preclude having stock plants growing, or contacting a group of participants for a focus group – but whatever your area of research, you won’t know what new questions to ask unless you have analyzed the answers to the previous set of questions.

13. Your first draft is equivalent to finishing

The magnum opus is put together and you, the author, understandably feel a huge sense of creativity, satisfaction and completion. BUT... it is at the point where it is all together for the first time, and you read through, that you must look for another set of factors. Have you created the appropriate thread for your theoretical argument? (where is the red thread that weaves through and integrates your work?) Are the strands throughout your work, and are they cohesive? Working on individual chapters can mean that the coherent approach is lost; there is also potential for repetition. Make sure that your framework is still apparent in your writing, is still logical and that you are still being precise and concise. Create links between parts to guide the reader but also to fuse your argument. This takes times. Do not expect that the final draft means the end. It can take at least 3 months to iron out all the inconsistencies, and overlaps while checking for accuracy (especially in terms of citations and referencing).

It is also at this stage that you may find that you have changed layout, font, style ... all those irritating things. Keep everything (particularly headings and subheadings) as simple as possible, and when you have decided what system you are using, write it down above your computer and stick to it. And use an accepted format for you discipline. Pushing the boundaries can be saved as an experience for after the graduation.

14. Research degrees can be your hobby

Treating your research like a job, with start times and finishing times, and working on it every day, is likely to achieve a successful and timely outcome. There are several advantages to this. Firstly, the ‘every day’ approach means you don’t ever forget what you are doing. The second is that you do make progress – and progress is encouraging. A third factor is that your supervisor will feel positively about your motivation and dedication, and, of course, will be able to comment about this when writing references for scholarships, funding employment, etcetera.

By exploding these myths, we hope that you will be able to complete your research experience within time and successfully. Other myths may creep up on you – so be the independent critical thinker that you are and don’t take them on face value no matter how enticing. Focus on your goal, unearth the myths and go for it …