A short guide to supervising postgraduate students in South Africa

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by

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Preface

I am a firm supporter of LaTeX so this document is typeset in LaTeX and all of the examples of documents are available as LaTeX source. For those Microsoft Word users among us, I would suggesting using Adobe Acrobat to isolate the required pages and then copying the text and pasting that into a Word document. One could also use one of the many "free" tools to convert PDF to Word.

Note: The name of this guide was inspired by *The (Not So) Short Introduction to LaTeX* by Tobi Oetiker

Acknowledgements

Supervision can be tough if one tries to do it on one's own. I learnt very early on that even experienced supervisors can face new challenges and that seeking advice is not a sign of weakness but a way to grow in this domain. I asked questions and started discussions to try to find better ways to assist my students. The community of supervisors is, in general, very supportive and willing to share.

This guide would not have been possible without the inputs – direct and indirect – from a long list of fellow "travellers". I hope that the list below includes everyone who has made a contribution.

- Colin Pilkington
- Ruthea Vorster
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- Sigrid Ewert
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- Judy van Biljon
- Yvonne Sanders
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If I have left anyone out then please accept my apologies.

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Chapter 1

Introduction

1.1 Overview

Supervising postgraduate students[1] is challenging. The particular circumstances that we face in South Africa – underprepared students, too many students, too few supervisors, inexperienced supervisors, lack of funding, poor infrastructure, etc. – can make this task even more difficult. The aim of this guide is to share my experiences of 25 or so years of supervising postgraduate students.

I expect to learn about supervision as I write this guide and I hope it will be useful to all supervisors.

In the guide I try to trace the supervisory "journey" – from the perspective of the supervisor – from the application made by a student to the graduation of that student. The guide is structured around that path.

1.2 The supervisory journey

The stages on the journey are given below along with pointers to the chapters where I discuss them in more detail.

Application The student applies, possibly after consulting with you but sometimes without doing so.

Selection You, as a supervisor, have to decide whether or not to accept the student – see Chapter 4 for some ideas on how you can decide whether working with a student is likely to be successful.

Registration If you have agreed to supervise the student then he/she can register. Most institutions do not allow you to work with a student until their registration is complete.

Proposal Once the student has registered then the supervison process really gets going.

[1] In this guide, postgraduate students should normally be taken to be Master's and PhD students although many of the comments are applicable to Honours students as well

In Chapters 2 and 3 I discuss the role of the supervisor and of the co-supervisor (if there is a case for one).

In Chapters 5 and 6 I give some ideas on how to get the process off on the right foot.

In Chapter 7 I build on the theme of getting off on the right foot and then move on to details of the proposal phase of the student's research including details of what a proposal could look like and how a proposal would be assessed.

Ethics clearance Once the student has successfully completed their proposal then he/she has reached the stage where he/she needs to apply for ethics clearance to actually undertake their research. In Chapter 8 I discuss how you could assist your students to satisfy the requirements of the local ethics committee.

Research Once the student has completed their proposal and received ethics clearance then he/she can start on their research. This is covered in Chapter 9.

Writing up A well written document makes the examiners' task much easier and can make a difference in the student's result. In Chapter 11 I discuss writing up and in Chapter 12 I discuss the related issue of publishing with your students.

Submission At some point you will decide that your student is ready to submit. I discuss issues related to submission in Chapter 13.

Examination There is not a lot that the supervisor[s] can do while the student's work is being examined. Depending on the result there could be work to do later and this may require going through some of the steps again.

Graduation As a supervisor, you should always make a serious attempt to attend the graduation ceremonies for your students. They appreciate it and so do their families. Be prepared to have your photograph taken (lots).

I think that a supervisor learns a lot about supervision by reading and thinking about theses and dissertations. One way of fruitfully doing this and at the same time contributing to the discipline is by examining students for other supervisors (see Chapter 15 for more on this). I believe that you get asked to examine if you are relatively well known in the discipline and if you have an online presence so people can easily track you down and find out more about you. In addition, you are likely to get more supervision requests if you have a presence. I expand on these ideas in Chapter 16.

1.3 In closing

Obviously this is not the first document that sets out to guide new supervisors. See Lee (2012), Remenyi and Money (2012) and Toncich (2016) for some other examples. What I try to do to make this guide unique and useful is to tell my story based on what I have been through in the South African context. My context is focussed on the computing disciplines and specifically computer science but the guide may be useful in other disciplines in South Africa (SA) as well.

Chapter 2

The supervisor

2.1 Overview

"A good supervisor is a guide and mentor, not an encyclopedia or a self-help book."
(Rolando Serra Toledo)

It has been shown that an effective supervision process can make a big difference in the quality of the degree and the time that is taken to complete the degree.

The supervision process is a relationship and it requires both parties to be involved and engaged to make it work. The supervisor will typically have lots of experience in doing research and in postgraduate supervision. The postgraduate student should make use of this experience by making the supervision process as productive for themselves as possible.

2.2 The role of the supervisor

In a general sense, the role of the supervisor (possibly assisted by a co-supervisor) is to guide the student through the process (administrative and academic) of completing a postgraduate degree.

In particular[1]:

- The supervisor should know of and understand how to implement the various university, faculty/college or school/department policies and procedures for postgraduate supervision, these include (but are not necessarily limited to)
  - application,
  - registration,
  - bursaries,
  - change of title (or other details),
  - progress reports,

[1]The list below has been developed using information provided by The University of the Witwatersrand, Johannesburg and the University of South Africa (UNISA)

  - ethics clearance,
  - research permissions,
  - intellectual property,
  - intention to submit,
  - similarity checking,
  - submission,
  - finalising the thesis, and
  - graduation.

- The supervisor must treat the candidate with courtesy and fairness.
- The supervisor must be accessible to the candidate.
- The supervisor should suggest appropriate developmental goals and assistance towards those goals by directing the candidate to workshops or lectures designed for this purpose, including training in the use of databases and research software.
- The supervisor undertakes to provide guidance for the candidate's research project in relation to the design and scope of the project, the relevant literature and information sources, research methods and data analysis.
- The supervisor should assist the candidate with developing a research plan, including requirements in respect of ethics clearance, appropriate deadlines and timetables, and other relevant matters, to allow for the successful completion of the research.
- The supervisor must provide appropriate guidance by alerting the candidate to helpful scholarly sources.
- The supervisor must provide guidance with regard to the structure and content of the dissertation or thesis.
- The supervisor should draw the candidate's attention to linguistic errors, inadequately substantiated or poorly formulated statements and incorrect referencing.
- The supervisor will provide advice that can help the student to improve his/her writing. This may include referrals for language and academic writing training.
- The supervisor should recommend professional language editing if he/she feels this is appropriate (or if policy decrees it is a requirement).
- The supervisor will provide guidance on technical aspects of writing such as referencing as well as on the discipline specific requirements.

- The supervisor must provide timeous feedback on the candidate's technical presentation and methodology. In this context "timeous" can be related to the stage at which the student is in his/her work – answering a questions about methodology should be done within a few days, reading a complete draft of the student's thesis could take two weeks.
- The supervisor must ensure the student has the opportunity to present work at postgraduate/staff seminars/national/international conferences as appropriate.
- The supervisor must assist with the publication of research articles where appropriate.
- The supervisor must discuss the ownership of research conducted by the candidate in accordance with the university guidelines and rules on intellectual property, co-authorship and copyright.
- The supervisor must ensure that the research is conducted in accordance with the university's policy on plagiarism.
- The supervisor should ensure that the thesis or dissertation meets the requirements set out in the policies.
- The supervisor must advise the candidate on the academic standard of the dissertation or thesis.
- The supervisor has a duty to refuse to allow the submission of sub-standard work for examination.

If a co-supervisor has been appointed:

- The co-supervisor is expected to play an active role in the candidate's supervision.
- The supervisor and co-supervisor must liaise regularly about the candidate's work.
- The supervisor and co-supervisor should agree on their respective roles and responsibilities and the mode of communication with the candidate.

I would consider it my role as a supervisor of a Master's or PhD student to

- recommend publications and provide or suggest some sources for literature studies,
- advise the student on techniques for sourcing publications,
- guide the student in selecting a suitable research topic which will satisfy the requirement of their work making a significant contribution to knowledge in the area of study,
- guide the student in selecting an appropriate research approach, referring them to literature on research approaches and showing examples of other studies, where appropriate,
- advise the student in terms of performing the research – i.e. collecting and analysing the data, and

- advise the student on the writing up of the final document.

Based on my experience as a supervisor, I would consider the role of the student to be to

- read – starting with reading other PhD theses (or Master's dissertations) in the area and then moving on to related articles,
- think – the reading needs to be active and not passive,
- engage with the research – it is the student's thesis or dissertation so it is their responsibility to do their best to understand what they are trying to do and why they are trying to do it in the way that they are,
- do the work that they are required to do,
- talk to their supervisor,
- listen to their supervisor,
- do what their supervisor asks/tells them to do, and
- not waste the supervisor's [and co-supervisor's] (or their own) time.

2.3 In closing

I cannot be a good supervisor unless the student plays their part!

Chapter 3

Co-supervision

3.1 Why have a co-supervisor?

There are many reasons to have a co-supervisor.

- It may be a departmental requirement.
  - First time (or "inexperienced") supervisors are deemed (by management) to need to be overseen by an "experienced" supervisor,
  - more senior academics are required to mentor more junior academics and this is one place where mentoring can be done, or
  - an external supervisor must have an internal co-supervisor.
- The student's work is "multi-disciplinary" and so it makes sense to have an supervisor from each area.
- It is a personal preference of the supervisors. This could range from a recently graduated Master's or PhD candidate embarking on their first supervision and wanting some support, to an experienced supervisor close to retirement who involves someone else in a "succession planning" sense.

The role of the co-supervisor is quite strongly defined by the "why have a co-supervisor?" question above. I will discuss each of these situations below.

3.1.1 The developing supervisor situation

If you are an "inexperienced" supervisor who is required to (or wants to) choose a co-supervisor to "teach you the ropes" then the co-supervisor should be someone who

1. knows the policies and procedures of your institution,
2. understands the practical implications of these policies and procedures,
3. will guide you in coping with these policies and procedures,

4. knows the people involved in the processess,
5. has a good record of successful supervisions,
6. has a good record of examining postgraduate degrees,
7. has the time to spend with you,
8. is prepared to commit to the task, and
9. is someone that you can work with even if the going gets tough.

3.1.2 The mentor-mentee situation

If you are a mentor who is required to co-supervise with junior staff to tick that box on your performance management sheet then it is probably not as important to define in advance what the role of the co-supervisor should be and more important to consider what you can do to help the mentee mature. This applies equally if you are a mentor who is invited into a co-supervision by an inexperienced person. In this relationship the mentor could formally be the primary supervisor or the co-supervisor but either way it is their responsibility to make sure that the process works.

The mentor should be someone who

1. knows the policies and procedures of the institution,
2. understands the practical implications of these policies and procedures,
3. knows how to cope with these policies and procedures,
4. knows the people involved in the processess,
5. has a good record of successful supervisions,
6. has a good record of examining postgraduate degrees,
7. has the time, energy and *willingness* to advise the mentee, and
8. is prepared to commit to the task.

In addition, I think it is important that the mentor can (at some stage in the process) step back and allow the mentee to take the lead role in the co-supervision.

3.1.3 Multi-disciplinary co-supervision

If the student's work is multidisciplinary, each supervisor should be responsible to the student for the content in their field. The rest of the supervision responsibilities should be decided based on the issues like experience, availability, etc.

3.1.4 Preferred model

If it is a supervisor's preference (always or for some student) to take on a co-supervisor, the supervisor needs to negotiate the roles and resonsibilities of each supervisor with the co-supervisor early in the supervision journey so that everyone is clear as to who does what and when.

3.1.5 The external supervisor

Sometimes a domain expert is appointed as a student's "main" supervisor but university policy requires that an internal person be appointed as the primary supervisor. In such a situation it seems clear that the internal person should only be responsible for the administrative issues in the supervision. Unfortunately, however, things are seldom quite so clear cut. External "experts" are quite often over-extended and are, therefore, unable or unwilling to really engage in the supervision process. This makes it extremely important to discuss the parameters governing the supervison and coming up with a "contract" that works for both supervisors and the student.

3.2 How to make co-supervision work

Co-supervision can complicate the supervisory process as there is an extra person involved in the process. It is thus imperative that the co-supervisors are clear in advance of what their roles and responsibilities are going to be. Grossman and Crowther (2015) is a very interesting paper about how to make co-supervision work.

Things to consider are:

1. Who is the primary supervisor?
2. How is the student selected?
3. How is the student's topic selected?
4. How are meetings handled?
5. How is communication with the student handled?
6. Who reads the student's work?
7. Who gives feedback to the student?
8. Who handles the administrative responsibilities?
9. What do you expect from the student?

Each situation is different so these things should be considered and decided upon for each student. If you have a good relationship with the person with whom you are going to be co-supervising, it might not be necessary to spell everything out in detail. In general, however, it is a good idea to be clear about who does what and it is probably best for everyone involved to have a document that spells out as many of these things as possible in advance.

3.3 Problems that could arise in co-supervision

The freeloader In all co-supervision relationships, one should of course be very careful to avoid co-supervisors who want all the glory but none of the work. Unfortunately, this is not always easy to determine beforehand but negotiating a working document at the beginning of the process can make this a bit easier. Also re-negotiating this "contract" at regular intervals can lessen the chances of a disaster as issues are brought into the open.

Different expectations Once again having a clear "contract" that is regularly re-negotiated can alleviate the problem where co-supervisors have different ideas of what they should be doing.

Different workloads In my experience it is very hard to predict when you, or the co-supervisor, will suddenly be swamped with other work and cannot carry your load in the supervision. If you have a decent working relationship with the other person then there is some scope for being flexible about who does what, when. It is important to bear in mind that this is likely to happen in an academic environment and to try to address the issue before it becomes a major stumbling block. Once again, good communication is the key.

3.4 Supervisory panels

An approach that is in some senses similar to co-supervison is the idea of supervisory panels. Here the student is allocated a number of academics (or sometimes outside experts) who are to be involved in their supervison. It is especially important to be clear, in advance, who is responsible for what.

I have worked with a model where the student has a supervisor (and possibly a co-supervisor) who is responsible for the whole process plus a small group of additional people who are involved at specific milestones on the journey. For example, the student and supervisor would work on the proposal and then just before the proposal is submitted, the panel would read and comment on the proposal. I try to do this for my students even when there is not formal process in place. This often involves asking for favours and then needing to return the favour but I think it is worth it for the student.

3.5 In closing

Personally, I like co-supervision. I think it is a good thing for the student – he or she gets comment, advice, feedback, etc. from more than one person so there is less chance of something slipping through for the examiners to find. I also find that having someone else around to share the load when necessary is a comfort factor for me.

A warning – do not go into co-supervision with the misguided impression that it will mean less work and less time spent for you. Normally, the converse is true – there is more work to be done (because of the communcation between supervisors) and it takes more time (as the student

typically gets feedback from two supervisors and both supervisors need to be there when this happens (or else you need to follow up to find out what the co-supervisor suggests)).

Chapter 4

Selecting students

4.1 Introduction

I get a lot of supervison requests – more now that I have a fairly good web presence[1] and applicants seem to like the "Professor" title. There is a limit to the number of students that I can supervise so I cannot accept everyone who asks. This means I need some way of deciding on which students to consider seriously and potentially to accept.

4.2 The process of selecting students

There are a number of things that I would look at in deciding whether or not to consider a potential student. These are:

- Can the student write decent English?

  This can, to some extent, be assessed by looking at the email they send when making their first contact with me.

  If the English is really poor or if it is riddled with *sms*-speak then I would probably not be prepared to take the student.

  If the email does not contain enough information to enable to me to make a decision then I would ask the student to write something for me. This writing task could double as a way of finding out if the student has any reasonable ideas of a research topic.

- What sort of marks are reflected on the student's transcripts?

  Good marks on the transcript (no matter what the institution) do not necessarily mean that the student is well prepared/equipped for an M or D but poor marks are a very strong

[1] See
`http://osprey.unisa.ac.za/research/profile2.htm?email=SANDEID&title=Prof&fname=Ian&sname=Sanders`,
`https://sites.google.com/site/iansandersacademiccv/home`,
`https://scholar.google.co.za/citations?user=fsnRRkIAAAAJ&hl=en` and
`https://sites.google.com/site/postgraduatestudentresources/home`

indicator that the applicant probably will not cope with a postgraduate degree. Of course, an applicant from MIT with mediocre marks will possibly be worth taking a chance on.

- What universit[y|ies] awarded the applicant's previous degrees?

  There are many different universities and these could have differing standards so it is always useful to have some idea of what graduating from a given university means in terms of the preparedness of an applicant for postgraduate studies.

  I often tell the story of an Honours student of mine who wanted to do her PhD at a certain US university. No one at the university had ever heard of Wits and so they had no idea of the standards of that institution. They asked me for my opinion of the student and then grudgingly accepted her. When she did *really* well in her qualifying exams, she paved the way for other students from Wits as the US university now had a "benchmark".

  So, keep a list of where your (or your colleagues') successful students studied and use that to help you make your decisions.

  Also, if you don't know anything about the applicant's university, use your contacts to see if anyone else does.

- Does the applicant have any reasonable ideas about what constitutes research?

  Many students have the idea that doing a Master's or (worse) a PhD is simply about writing a big program and then reporting on that program. Beware of students who seem to have that idea – you will not be able to convince them otherwise no matter how hard you try. I know! I have been there!

  When the applicant first contacts you, ask them to give you some ideas of research topics that they might be interested in. Use these topics to try to see if you believe that the student has a reasonable idea of what research is all about.

- Has the applicant suggested an interesting/appropriate research topic?

  This point is similar to, but different from, the point above. Remember the student's PhD (or M) is going to become a large part of your life for the next 6 or so years (4 or so for an M), so make sure that it is something you are interested in, already know a bit about or are prepared/keen to spend time learning about. If it is not something you would be prepared to invest time and effort in then say "no" or (if everything else indicates a possibly decent student) point the student to one of your colleagues.

- Does the applicant seem to be organised, conscientious, etc.?

  You can often answer this question by considering the email interactions that you have with the applicant. If you ask a question and they do not answer that question (either they ignore it or they give you an answer to a different question) then you should take this as a sign of how likely they are to address your concerns or act on your feedback to the work in their degree. If they don't take you seriously when they are trying to "woo" you, how likely is it that they will take you seriously when they perceive that they are the "customer"?

- Do you think that you will be able to work with the applicant?

  Supervision is a relationship so you need to be sure that you can work with the student. Your style of supervising needs to match with the way the student would like to be supervised. Some students require, or at least choose, less hands on supervison (fewer meetings, less pointing in the right direction, etc.) while others require a lot of hand-holding. Think about how you would choose to, or will be able to, handle the supervison process and see whether you think that will work with the student.

  You also need to be sure that the student will take your supervision efforts seriously – it is very frustrating to put in time and effort if the student does not appreciate this.

  This is a hard question to answer if you are in a "distance learning" situation. Look for signs of whether the student will take your advice; do what you ask them to do; respond promptly; respond appropriately; etc. when you communicate with them via email. If it seems that they do not really read and engage with your emails when they are trying to "win" you as a supervisor then they are even less likely to listen when you have taken them on as a student.

  In a face-to-face environment one may have to consider the applicant's punctuality; personal hygiene; etc. as well as whether they seem to take the interactions seriously.

4.3 Grooming students

If you supervise Honours research projects (or even teach undergraduates) then it makes sense to identify good students and approach them about postgraduate studies. Sometimes this can lead to good students that you know a bit about registering to do postgraduate studies with you. Of course, sometimes you spend time talking to them about postgraduate studies and they choose a different supervisor.

A related approach is to have Honours projects that lead into more indepth topics that are suitable for Master's or PhD topics. Again, this can attract students to do their postgraduate studies with you.

4.4 In closing

The supervisor-student relationship is just that – a relationship – and as with all relationships requires thinking carefully about before going into the relationship and careful/thoughtful maintenance during the course of the relationship. If it doesn't work at the beginning it can be really hard to fix so try to start off by being careful about the students you accept and then be clear about how the relationship is going to work in the future.

Chapter 5

Getting started

5.1 Engagement

In order for the supervisory relationship to be productive it is worthwhile thinking about and defining the "terms of engagement" as early in the process as one can. Depending on the supervisor and the student this could be a very formal document or a much less formal verbal agreement. Many universities nowadays require the supervisor[s] and the student to sign a supervision agreement/contract and that document could be used for setting out the details of how supervision will take place.

Appendix A gives an example of a supervisor agreement for the post-proposal stage of a PhD. This agreement is at an abstract level – what the supervisor expects of the student and what the student can expect of the supervisor. I think that it is important to spell out these issues so that there are no surprises later. A similar document can be drawn up for a Master's degree. In addition, similar agreements could be put in place for the proposal phase.

5.2 Meetings

Obviously supervising a student with whom you can meet on a regular basis is different to supervising at a distance. In those situations where it is possibly to meet regularly then this should be done. The first matter to resolve is how frequently meetings should happen. In most instances meeting once a week might be too frequent (although there are some students who work better with very frequent short meetings). I have found that meeting every two weeks works quite well for students who are essentially working full time on their studies. Once a month is often better for students who have full-time jobs and are studying part time.

Some things which should be considered in regard to such meetings are:

- The frequency and length of meetings should be appropriate for the student.

  When I was doing my MSc I met with my supervisor first thing every Monday morning for at most 30 minutes. We set this up as I was working full time and having the meetings encouraged me to do at least a small amount of work every weekend.

When I was doing my PhD I met my supervisor once every 3 or 4 months for an afternoon. In this case, I was largely working on my own and the meetings were to make sure that I was focussed and working on the correct things.

- The meetings must be productive. This requires that the supervisor[s] and the student prepare in advance. Having a formal agenda for the meeting may be overkill but each participant should at least have a clear idea of what they expect from the meeting.
- It should be the responsibility of someone (normally the student) to summarise the meeting and to note any actions that should be taken by any of the participants. This person should then circulate the notes of the meeting to all involved in the supervison process (even if they could not attend the meeting).
- It may be a good idea for the student to audio record the meeting.

The discussion around these issues can lead to a more *operational* supervisor agreement than the one discussed above. This also relates to the *annual time plan* that I discuss in Section 9.2.

5.3 Distance students

It is obviously difficult in a distance learning environment to have regular meetings with your students if they actually are based a long way away but it is very important that you make regular contact with them. I have tried Skype, Zoom, etc. but they have not really worked that well for me (although I know other supervisors who are very happy to use Skype, etc.). I tend to rely on lots of email communication. This works for some students but others often simply ignore the emails until they are ready to communicate with me. I tend to accept this without making demands and make a point of responding very promptly when they do decide to email me.

I think that it is very important that one does have at least a few face to face meetings with each of one's students even if they are based a long way away. I always encourage my students to plan to visit me.

One way of making this happen is for the student to plan to attend the annual SAICSIT[1] Master's and Doctoral Symposium, which typically takes place the day before the main SAICSIT Research and Development conference. The students can then either stay on for the main conference and we can meet there or they can visit me before or after the M&D symposium.

The School of Computing at Unisa typically hosts two M&D symposia/workshops every year. These workshops are designed to allow students to interact and to learn about various research related topics. Other institutions probably also offer such workshops. The workshops are a wonderful opportunity for students to engage with other students who are on the same journey. They are also a good time for students to meet with their supervisors.

[1] South African Institute of Computer Scientists and Information Technologists

5.4 In closing

Supervision tends to be successful if there is lots of "meaningful" contact between the student and the supervisor[s]. This does not normally happen unless it is planned in advance and actively encouraged.

Chapter 6

In the beginning

6.1 Introduction

Over the years I have come to realise that many students who decide that they want to do a postgraduate degree do not really understand what they are letting themselves in for. Often they have a very vague idea of doing some big[ger] project and writing a report on that. They do not know what doing a Master's degree or a PhD involves. Part of the supervision process is to teach them about doing research and then helping them to actually do some research. One's job as a supervisor is, however, made much easier if the students are a bit more prepared for the journey that they are setting out on.

6.2 Workshops

One way that students can prepare for doing a postgraduate degree is by attending some (or all) of the workshops that most institutions offer to their students. These workshops typically include topics like

- research methodologies,
- data collection,
- statistical techniques,
- use of data analysis tools,
- use of reference management tools, and
- writing skills.

Often these workshops are offered by very experienced reseachers/supervisors. As a supervisor, one should actively encourage one's students to attend such workshops.

6.3 Read a thesis or dissertation

I am becoming more and more convinced that before a student starts out on a Master's degree or a PhD they should read a complete dissertation or thesis. This will give them an idea of the enormity of the task that they are embarking on. In addition, it will (hopefully) give them some idea of the structure/layout of the document that they will be asked to produce.

I don't believe it is necessary that the dissertation or thesis that they read should be directly related to the area in which they plan to work. I think it is more important that they read a document that has been examined and has received good reports from the examiners. As a supervisor I would suggest that you maintain a list of such dissertations and theses and make the list available to the students when (or even before) they start their proposal.

Of course, one cannot force a student to read anything so to encourage them to do the reading you could ask them to consider specific aspects of the document that they read and to write a short report on the document. You could require them to read the document, think about and then comment on:

- The presentation of the document – what it looks like, what appears in the front matter, what appears in the back matter, how the figures, tables etc. are presented, the language used, the way algorithms are specified, etc.
- The structure of the document – what chapters there are, what appears in the different chapters, how the chapters are logically arranged and connected, etc.
- The research methodology adopted – Is this explicitly stated or only implied? Is it appropriate?
- The contribution made by the research – A PhD requires the candidate to make a significant and novel contribution in the field. Has this been achieved? What is the contribution? Is the thesis explicit about what the contribution is? Has a publication come from the PhD work? Where was the work published? etc.

  A Master's degree does not have the same requirement of originality but the student should still be able to articulate what they did and what their research adds to the field. Has this been accomplished? Did a publication ensue? Where was the work published? What is the impact of the publication?

This reading and writing exercise leads to the next issue that I think should be dealt with very early on in the student's studies – being able to prepare a professional looking document.

6.4 Document processing tools

Most students who approach one with requests for supervision are fairly computer literate – they can use email, Word, Excel, etc. The problem is, however, that they tend to use the tools badly. In particular, they can fairly quickly put together a document using Word but they do so badly because they do not really know how to use the tool properly. For example, they do not

know how to use templates and often do not even know how to use the predefined styles. This means that they prepare documents where each section heading is created separately by hand so that headings at the same level often do not even look the same. This problem increases in size and complexity as their document grows. Trying to fix something like this shortly before submission is a nightmare!

One way to handle the problem is to insist that they do a proper MS Word training course. Such courses are available but they are often quite pricey. Alternatively the supervisor (or better – the intitution) should provide a properly designed (and well documented) MS Word template for postgraduate students to use.

Another way to handle the problem is to require that they use LaTeX for their document preparation. Using even very basic LaTeX it is possible to create documents that look neat and consistent, and LaTeX automatically handles a number of problems that students struggle with in Word – white space, widows, floats, etc. In addition, I find it quite simple to set up a LaTeX template for the proposal and the dissertation/thesis and give that to the students to use. There are lots of simple guides (and some very complicated guides) for LaTeX and it really does not take a lot of effort to produce a decent looking document. In addition, LaTeX does mathematical notation really well. This is crucial for students who are doing computer science research.

In my opinion, it makes one's life as a supervisor much easier if one can get the students to produce good looking documents right from the beginning of their studies.

6.5 Reference management tools

It is my experience that students also struggle to get their references correct and that, as a supervisor, one is continually pointing out to students that they have cited incorrectly and/or that the items in their reference list are incomplete or just plain wrong. In addition, examiners are very likely to see poor referencing as a lack of attention to detail and are thus more likely to reject a dissertation or thesis or to send it back for revisions.

Reference management tools, if used correctly, can greatly assist the students to do referencing properly.There are many of these tools – Mendeley, Qiqqa, etc.). Most university libraries offer training on the use of one or other reference management tool. Students should be encouraged to attend one of these courses as soon as they have registered for their degree. The students should also be "encouraged" from the outset of their research to get their references correct. This initial investment of time will pay benefits in the long run.

Many of the reference management tools allow for exporting to `bibtex` for LaTeX users.

No matter what approach a student takes to doing referencing the onus is on them to do it correctly. It is the supervisor's responsibility to point out to the students that their referencing is not up to standard but it is **not** the supervisor's responsibility to make the corrections. In addition, the supervisor should *not* have to check references in every draft that the student submits – the student should get it right the first time!

6.6 Referencing styles

There are two main referencing types/categories – *author, year* or *numeric*. In each category there are a number of specific styles. Many institutions decree that their postgraduate students use a particular style and some even give comprehensive documentation on how to do so correctly. Unisa recommends the use of the Harvard style.

My personal preference for dissertations and theses is an *author, year* style. I do not have a preference on which one students use provided they are consistent. I make a LaTeX template available to my students. This template handles referencing in a consistent *author, year* style – it is APA-like.

No matter what a student chooses to use the most important factors are consistency, correctness and completeness. Citations should look the same in the body of the text and should be appropriate – parenthetical or textual as required. All journal articles should be listed in the same format with the same details provided. All details should be correct. All details about a given publication should be provided. As an examiner I am hypercritical about referencing and I know there are examiners who are more critical than I am.

As a supervisor it is one's responsibility to point out *early* and *often* any errors in your student's referencing but at some point you are allowed to *give up* if they choose not to listen to you.

6.7 Writing

In addition to the more technical aspects of layout, presentation, referencing, etc. in a document the student's writing style can make a big impact in terms influencing an examiner. Students should be encouraged from the outset to try to write simply and clearly.

- Never use a "big" word when a "small" word will do.
- Try to keep sentences short.
- Say what you mean and mean what you say!
- Read what you have written and think about whether it conveys the thought that you are trying to convey.

I believe that any academic should learn to write adequately. Language editing can help to make a particular document more readable (and many institutions require it for just this reason) but spending time and money on a writing course pays much better dividends. If your students do not write well, then recommend that they attend a writing course.

6.8 In closing

It is important that students very quickly get into the habit of preparing neat, well structured documents that are easy to read and where the technical aspects are handled correctly. From a

supervisor's perspective it is much easier to handle these aspects at the beginning stages of the student's proposal than trying to fix them when you are presented with a 250 page thesis.

Chapter 7

The proposal stage

7.1 Introduction

A good proposal can go a long way towards making for a successful dissertation or thesis. It, thus, makes lots of sense to put effort into the proposal. This means that the student (obviously) needs to put in a lot of effort but so do you.

When working with students on their proposals I try to do two things.

1. Help the students to get a very clear idea of what the research questions/aims are and what the approach to answering the questions or achieving the aims is going to be.

2. Help the student to get the technical aspects sorted out.

Achieving point 1 means that the student has to do quite a bit of reading and thinking about what they read in order to understand the background to the research area; to understand what has been done by other researchers in the area; and to find the gaps. Once a gap has been found and the student decides to focus on that gap then further reading is required to develop a better understanding of the problem and come up with ideas on how the gap could be addressed. In computer science research one of the things that one, as a supervisor, has to steer the student away from is the idea that writing a big program is doing research.

Successfully accomplishing point 2 means that the student can convey their message in clear and correct English; that they can produce a neat professional looking document; that they can cite references correctly; and that they can produce a reference list where each reference is correct and complete. See Chapter 6 for more on these technical aspects.

7.2 The narrative

In my experience, many students do not write a good proposal because they do not have a clear idea of what they might be setting out to do. In order to help them with getting the idea of their research clear in their own minds, I ask them to write the "story" of their research. This narrative should be written in simple English without references and should not be longer that 2 pages. It should tell the reader

- What the probem is?
- Why it would be worth solving this problem?
- How the student proposes to tackle the problem?
- What they expect to learn as they work on the problem?
- What the impact of solving the problem is likely to be?

Once the student can write a clear narrative then they can start fleshing this out into a complete proposal.

7.3 A generic proposal

The research that students do for their degrees could vary greatly but essentially all proposals should end up being quite similar at least in structure.

Introduction This chapter should introduce the problem at a level that could be understood by any intelligent outsider (anybody with a degree in any area is a good target to aim at). It should include sections which define the problem and discuss the importance of the problem. It could include the research questions/aims and the reseach objectives but this depends on how well the problem and the specific questions to be addressed are defined. If the approach to solving the problem is well defined then the chapter could give some idea of how the student will tackle the problem and could even give some idea of the hoped for results and the likely significance of these results. This chapter should also give a good idea of the overall structure of the rest of the document.

Background and Related Work The aim of this chapter is to give the reader a detailed picture of what has been done in the field of the research in the past and how that relates to what the student is planning to do. The chapter should discuss the background to the problem, alternative and related approaches and why they are significant to the problem (what they are, what can be learned from them and how they can be used to solve the problem).

It should be clear from this chapter that the student has

- read widely in the area of research,
- read deeply in the specific focus of the research,
- knows what has been done (or not done) in the specific focus,
- understands the details of what they have read, and
- understands the significance of what they have read.

This chapter should also cover background material (well established theories, tried and tested techniques, etc.) that is going to underpin what the student will be doing in their research.

Research Questions/Hypotheses/Aims/Objectives If the research questions have not been presented in the introductory chapter then they should be given here. The research questions should clear, precise and answerable. It is also possible to formulate a clear and precise hypothesis which can be tested. Sometimes a focussed research aim is easier to formulate than a research question or hypothesis. In computer science a clear research aim is often the most appropriate approach to take.

Research Methodology Choosing an *appropriate* strategy for, or approach to, addressing the research problem (questions and/or aims) is a crucial part of doing research that is accepted in the academic community. In this chapter the proposed research strategy should be presented (see Pilkington and Pretorius (2015) for more details about research strategies in the computing disciplines). This should start from the researcher's philospohical world view and then present an appropriate research design and methods to verify the hypothesis, answer the research questions or achieve the aim. In this chapter the student should give details of what they plan to do, why they will do it that way and how it will answer the research question or lead to acceptance or rejection of the hypothesis. Exactly what appears here depends on what type of research is planned.

Research Plan This chapter should make the application of the research methods in the research methodology chapter more concrete. The chapter should discuss more specifically how the research will be done. Risks should be made clear.

A time plan should be given as a table containing specific dates and specific deliverables broken down in reasonable detail so it is clear whether the student is on track or not as the research progresses. Vague deliverables like "research" and time periods like "3 weeks" will not suffice.

References A list of the cited works in the prescribed format.

Disclaimer As mentioned earlier, all research projects are not the same so all proposals cannot be the same. It is your task as a supervisor to assist the student to decide on an appropropriate format/layout for the proposal and to make that work. The criteria listed below can be used to judge the quality of the presented proposal.

7.4 Proposal Assessment Criteria

Different institutions have different ways of assessing proposals but the important objective that should be achieved by the proposal is that the student and the supervisor have a good idea that if the work presented in the proposal is completed properly then the student will successfully complete their research. They would still need to write the research up properly but that is a different issue from having a good plan of action.

In order to determine whether the student has completed a good proposal, the criteria given below can be considered.

Title The title should be informative and concise. It should provide adequate detail about the research, its context and contribution. Phrases like "An investigation of" should be avoided.

Problem Statement & Purpose of the Study The proposal should articulate an explicit, relevant, and significant problem/opportunity for the research.

Research Questions or Objectives The research questions should be concise, clearly stated, and aligned to the proposed research purpose.

Assumptions, delineations & limitations These should be clearly stated and relevant given the proposed research purpose, design, and methodology.

Literature Review Demonstrates that relevant, reliable literature in existing body of knowledge has been studied.

Research methodology Coherent, provides adequate detail and relevant for the research.

Contribution Meets the requirements for the degree as given below:

A Master's dissertation should demonstrate the candidate's ability to work independently and to reflect critically on theory and its application. The dissertation must demonstrate the candidate's ability to deal with complex issues both systematically and creatively; to design and critically appraise research; make sound judgments and communicate their conclusions clearly.

A Doctoral thesis must demonstrate high level research capability (as per the Master's dissertation but more evidence of critical thinking) and make a significant and original academic contribution at the frontiers of a discipline or field. The work must be of a quality to satisfy peer review and merit publication.

Structure and flow Well-structured research proposal.

Logical flow in presentation of the research proposal – introduction, problem statement, reviewed literature, and research methodology.

Referencing The selected (or in some cases required) referencing style must be correctly and consistently applied.

Presentation and technical layout The proposal should be of good quality as regards presentation, language and grammar. Other issues to consider are consistent headings; a correct and complete table of contents (plus list of figures and list of tables); and correct page numbers.

Overall This proposal will enable the completion of the research degree in the time allowed.

If the proposal is lacking in *any* of these aspects, the supervision process is likely to be negatively impacted and as a supervisor you should be concerned.

7.5 The contribution

The issue of making a "significant and original academic contribution at the frontiers of a discipline or field" is something that PhD students (and sometimes supervisors) struggle with. There are two aspects that a candidate needs to keep in mind when attempting to convince examiners that they have made a significant novel contribution – there needs to be something novel in their work and they must tell the story of why/how what they have done is novel. With these points in mind, developing a proposal for research which will make a significant novel contribution requires:

1. Reading the literature and finding a gap. That means finding some research problem that no one else has tackled.

2. Arguing that this thing (whatever it is) is worth investigating. The fact that no one has done it, does not necessarily mean that it is worth doing. There must be a good reason.

3. Arguing that doing this thing will make a significant novel contribution. Note that this argument should be in place before actually doing the research.

4. This argument leads to the research questions which will be addressed in the research.

5. The next step is deciding what should be done to adequately answer the research questions.

Steps 1 to 3 largely come from the literature review. Step 5 is choosing an appropriate research methodology/approach. The argument that is made by the candidate should be clear and consistent – from the title of the project, through the introduction, literature review, research questions and on to the proposed methodology.

The process is clearly more important at PhD level than a Master's level but Master's students' proposals should still include the same kind of argumentation.

7.6 What if the proposal is not acceptable?

In spite of your efforts as a supervisor it could still happen that a student does not produce an acceptable proposal in the time allowed. Sometimes this is because the student has not (or could not) put enough effort into their studies. Sometimes it is because the student thinks that they know better than you do what is required and does not take your advice. When the students fails their proposal, they try to focus the blame away from themselves and the supervisor is the easiest (most obvious) target. It is, thus, always important to be clear in spelling out your reservations to the student and you *must* keep records of the fact that you have communicated your concerns to the student. Doing so does not make an ugly situation any less ugly but it does help to show that you have done your job.

7.7 In closing

A good proposal increases the chances of the student doing good research and completing their degree. It is, thus, worthwhile putting in significant effort to ensure that the student has a very clear idea of what the research questions/aims are and what the approach to answering the questions or achieving the aims is going to be, and that the student can deal with the technical aspects of producing a good document.

Chapter 8

Ethics clearance

8.1 Overview

As a supervisor it is your responsibility to help your students learn to do *ethical* research – this includes showing them how to correctly use and acknowledge the work of other researchers and how to appropriately deal with primary and secondary data sources. See Chapter 17 for some resources related to doing ethical research. It is also your job to try to guide them through the quagmire that constitutes most universities' ethical clearance processes.

8.2 Dealing with the literature

Any researcher is required to be able to read the literature in their chosen field to find out what other researchers have done (and sometimes, more importantly, what has not been done). The researcher is then expected to be able to report on the "state of play" in the literature review chapter/section of their research document (proposal, article, thesis, dissertation or report). Failure to appropriately paraphrase the arguments made by other researchers or to give credit where it is due constitutes *plagiarism*. There are many sources that cover plagiarism (see Chapter 17) and it is your responsibility as a supervisor to make sure that your students know about these resources and to make sure that your students do not plagiarise.

There are many different *similarity checking* tools (for example,TurnItIn) that try to determine if a student (or other researcher) has done a cut and paste or "insufficiently paraphrased". Your university has probably given you and your students access to at least one such tool. You should encourage your students to make use of these tools to check their own writing. In addition, you should use the tools to check your student's work and give them feedback based on the reports generated by the tool.

When I am reading drafts of students' work, I tend to look for differences in writing style in the document that I am reading. That suggests to me that the student has copied the text from another source and pasted it into their document. A quick Google search of the "suspicious" text is often enough to confirm that this is the case. In some cases, the tip-off could be that the student has used words or phrases that seem "odd" based on the rest of the document.

If you do find a case of this cut-and-paste scenario then you should use it as a learning

exercise to show your student that their behaviour was questionable. It is never a good idea to accuse a student of deliberately cheating unless there is significant evidence of this.

Even if I don't find suspicious looking text, I do random Google searches of sentences from the student's work. Sometimes these searches show cut-and-paste and sometimes they highlight other problems in the the student's writing (for example, that the idea comes from a different source from that which the student is citing). Again you should use this situation as a teaching and learning experience.

8.3 Primary data

In most Master's or PhD research the student will collect their own data, using methods like questionnaires, surveys, interviews, or experiments, in order to be able to answer their research questions or to address their research aim. This data is typically termed *primary data*. Collecting such primary data often requires that the researcher has to deal with people. Doing ethical research requires that the researcher treats his/her research participants with respect and causes no harm to them. As a supervisor it is your job to try to teach your students to treat their research participants respectfully.

My approach to doing this is to ask my students questions about their data collection instruments. If they are doing questionnaires or interviews, then a good question to ask is *"How would you feel if someone asked you that question?"*. Other questions that can make your students think about the information that they plan to collect are: *How would you make use of that information?*, or *Is that information really necessary?*.

In some cases a student may decide to use or adapt a questionnaire that someone else has set up. In such cases, it may be necessary for your student to request permission to use/adapt the instrument, or at the very least (as an academic courtesy) let the original author know that they are doing so. Some research instruments have become "accepted tools" in various disciplines but it is still important that your students appropriately acknowledge the original sources/designers.

8.4 Secondary data

Some studies involve the use of *secondary data*. That is, data gathered from studies, surveys, or experiments that have been done by other researchers and sometimes for different purposes. This data also needs to be dealt with ethically and it is your job to help your students to do so. It is generally considered ethical practice to inform the owner of the original source that you are using the data, unless it is in the public domain.In some cases, it may be necessary to request permission to use such secondary data.

8.5 Ethics clearance applications

All institutions now require all researchers (including students) to apply for ethics clearance *before* they embark on their research. This applies to all research although ethics clearance for

research that does not involve people or animals often has a simpler process (sometimes even different forms to complete).

Note that some research can have added complications and supervisors and their students need to be aware of these. Doing research that involves children can be a challenge as only people over 18 of age can give informed consent to participate in a research project. This means that special arrangements are required if the student is including anyone under 18 years of age in their research. Parents or guardians need to be informed about the research and their consent must be given before data collection can begin.

In addition, doing research involving participants in a work or study environment means that the researcher needs to get gatekeeper permission to collect the data. The ethics review committee approves the research as a process, but the gatekeeper gives access to participants in their community or workplace.

These ethical clearance applications can often be rather confusing for the applicant. It is important that the supervisor is conversant with the process and procedures at their institution. I have found that it also helps to know the people who are involved in the process of assessing the applications – it makes it easier to ask for advice on what is expected.

8.6 In closing

Behaving ethically (and in a morally acceptable manner) is important in doing research. As a supervisor it is your job to make sure that your students develop the skills and attitude to be able to do so.

Chapter 9

The research phase

9.1 Introduction

Once the student has completed their proposal (and either defended it or had it externally examined) and they have obtained ethics clearance (and possibly other required permissions), they are ready to start actually doing their research. Each student's journey is likely to be different and as a supervisor it is your responsibility to keep your students working on their research and to keep them on track (as much as they allow you to). This means that you need to try to get them to formulate a plan for their research and then you must follow up with them as often as is necessary (and reasonable). In a face-to-face environment this can be achieved by regular meetings. In a distance learning environment the onus is on the supervisor to contact the students.

9.2 Planning

Typically a student's proposal document would have included a section on planning the research. This is, however, often not detailed enough to really help you or the student. So, ask the student to redo their time plan! Get them to make it very detailed in the short to medium term! It can be less detailed in the long term. The point is for them to tell you what they plan to do in the relatively near future and when exactly they plan to do this. As a supervisor I like to see such a plan and often will require my students to produce such a plan as their first post-proposal exercise.

Students often do not have an appreciation for how long things take – especially ethics clearance and such like – so it is useful to engage with them on their plan to get something realistic.

Be prepared to revise and re-negotiate the plan often – it is the only way that you can tell whether or not the student is on track.

9.3 Meetings/Contact

As mentioned earlier meetings (or at least regular contact) are vital to make the process run smoothly. The ideal is to have meetings and, if your students can manage meetings, then it is a real win. Depending on what tasks the students are currently involved in, the frequency/length of meetings could be different but make sure that they continue to happen.

I try to contact my distance (online) students every month or so (workload depending) if I do not hear from them in the meantime. Sometimes they respond and sometimes they do not. As a supervisor you cannot give up on them (even if you would like to) and you should keep trying to get them to "talk" to you. You should also try very hard to encourage them to visit you.

9.4 Ethics clearances, etc.

Ethics clearance and other various forms of permissions are becoming more and more of an issue in doing any research. Typically students are expected to get ethics clearance and the various permissions before they are allowed to commmence their research. These clearances are a hurdle that you have to assist your students in overcoming. Make sure that you know all the requirements, where to find the forms, what the ethics committees normally raise concerns about, etc. so that you can advise your students appropriately.

Always get the student to make the first pass at finding and completing the forms – it helps them in taking ownership of the research and also makes them think about the issues. It might be quicker to do it all yourself but that does not serve an educational purpose. Once the student has done the first pass then meet with them to discuss corrections, changes, etc. Repeat this phase as often as necessary!

9.5 Research journals, etc.

Most students do not have experience of doing research so it is your responsibility to guide them with regards to good practices. A research journal, in which they can record thoughts, ideas, notes about things they have read, notes about what they have been doing as they do their experiments or make their measurements, reflections on what the results could mean, etc. for later consideration for inclusion in their final document, is just one example of such good practice.

It is also useful to remind them to make backups of their writing, data, etc.

9.6 Literature review and updates

A PhD normally takes two to three years to complete after the student has passed their proposal. An MSc might take one or two years. This means that the literature review that the student did for their proposal rapidly becomes dated. You should advise your students that they will need to

continually update the relevant parts of their theses or dissertations. You should also advise them to set up alerts to be informed about new publications that may be relevant to their research.

Often the university library staff offer training courses/workshops for students to give an overview of the university databases available, how to search these databases and how to set up alerts.

9.7 Doing the research

Students do very different research for their degrees so it is difficult to come up with a generic process that applies to all students. Below I suggest some ideas to help in the process.

- Have regular meetings (or at the very least regular email exchanges) to see that the student is working and is on track.
- Set clear, well defined goals and monitor these.
- Make sure you all agree as to what the next step is.
- Give prompt and comprehensive feedback.

9.8 Making a significant novel contribution

In Section 7.5 I discussed how to address the idea of an significant novel proposal should be handled in the proposal. This idea should be carried through when the candidate writes up their thesis (or dissertation). There needs to be something novel in their work and they must tell the story of why/how what they have done is novel.

With this in mind, making and arguing a significant novel contribution requires:

1. Reading the literature and finding a gap. That means finding some research problem that no one else has tackled.
2. Arguing that this thing (whatever it is) is worth investigating. The fact that no one has done it, does not necessarily mean that it is worth doing. There must be a good reason.
3. Arguing that doing this thing will make a significant novel contribution. Note that this argument should be in place before actually doing the research.
4. This argument leads to the research questions which will be addressed in the research.
5. Deciding what should be done to adequately answer the research questions.
6. Doing the identified research
7. Reporting on the research
8. Arguing that the research has answered the research questions
9. Arguing the research has made the expected contribution.

9.9 In closing

Regular contact with your students and sharing your experience of doing research can make the journey much smoother but you cannot and should not do the student's work for them.

Chapter 10

The tools of the trade

10.1 Introduction

Earlier in the document (Chaper 6) I referred to tools for document processing (LaTeX and Microsoft Word) and reference management (Mendeley, Qiqqa, etc.) but there are many more tools that your students should be made aware of as they embark on their research journey. Some of these are general tools and some are more specific to particular disciplines or fields. As the supervisor you should already be aware of the tools specific to your own field and it should be part of your role to introduce your students to these tools (plus more general tools).

10.2 Research methodology semantic web

All students (including computer science students) should have a thorough understanding of research methodology. `http://eagle.unisa.ac.za/mediawiki/index.php/Semantic_Web_and_Research_Methodology` is a tool that allows researchers to explore ways of viewing research and the philosophies/designs/methods that guide it.

10.3 Statistical tools

- SPSS – *Statistical Package for the Social Sciences* is a software package used for interactive, or batched, statistical analysis.
- R – R is a programming language and free software environment for statistical computing and graphics.
- SAS – *Statistical Analysis Software*

See also Farnsworth (2019).

10.4 Data analysis tools

- Atlas.ti – a powerful tool for qualitative and mixed methods data analysis.

10.5 Computer science related tools

- Scikit-learn – a free software machine learning library for the Python programming language.
- Scikit-image – an open-source image processing library for the Python programming language.
- MatLab – a numerical computing environment that includes image processing and oher applications.
- Maple – a symbolic and numeric computing environment.

10.6 Shared repositories

It is useful if the supervisor has access to the papers cited by the student. A Mendeley group account can be set up to make this easier.

Other options for doing this are

- Google Drive
- Dropbox
- pCloud

For computer science research GitHub could also be a useful resource for sharing and storing code.

10.7 In closing

There are many tools available that can make doing research easier. As a supervisor you should know about the relevant tools for your field and be able to share this knowledge with your students.

Chapter 11

Writing up

"Writing up does not only happen at the end."
(Ian Sanders, 2016[1])

11.1 Introduction

Many students seem to be under the impression that one does the research and then writes it up. They also seem to think that the writing is a linear process – one writes the chapters in order (Introduction, Literature review, Methodology, Results, Discussion, Conclusion). Neither of these ideas is valid! It is your job as a supervisor to help your students understand this.

They should be writing all the time and they should be prepared to rewrite and restructure often. The literature review chapter evolves as they read more recent publications and the methodology chapter must be adapted as they do their research. The results and discussion chapters are normally written after completing their research but even these can be affected by rewrites elsewhere. I normally advise my students to write the introductory and concluding chapters last. Once the main body of the document is in place then they can write the front matter (Abstract, Acknowledgements, Preface, etc.) and finalise the back matter.

A suggestion for the form of a thesis or dissertation is given below but remember "one size/shape" does not necessarily "fit all". This means that you and your student need to apply your minds to come up with an appropriate structure for their work.

11.2 The structure of a typical thesis or dissertation

Abstract The abstract should briefly set the scene, say what was done and how it was done, say something about the data and the results, say what was learnt and finally should comment on the contribution made.

[1] I believe I used this for the first time in `https://sites.google.com/site/postgraduatestudentresources/home/the-research-process/writing-up?authuser=0` but I may have heard it from somewhere else before that.

Introduction There are two important aspects in writing a good introduction chapter. Level and scope – who the chapter is written for and what should be in the chapter. I believe that the introduction needs to be accessible to a broad audience. It should be readable by and understandable to any reasonably intelligent and educated person.

The introduction chapter should cover enough about the research so that anyone reading it will be able to understand what the problem the student was interested in was; how the problem was reduced to a focussed research question or research aim; what that question or aim was; how the student set about answering the question or achieving the aim; what they actually did; what results they achieved; what the significance of the results is; and how this work furthers knowledge in the area (more important for a PhD than for a Master's degree).

Writing a good introduction is difficult. The student (and the supervisor) should expect it to take time and be prepared to have the student rewrite and to do a lot of "polishing".

Background and literature review This chapter should elaborate on (or give details of) the problem and discuss why it is an important problem to tackle. It should then discuss background material relating to the field and related literature in the area. The aim here is to give the reader a detailed picture of what has been done in the past and how it relates to what the student did.

Research Methodology This chapter will make the problem more explicit and present the details of an approach to solving the problem or answering the research questions.

Results Here the raw results which arise as a consequence of the methodology are presented. This could be graphs or tables of measurements, proofs, lemmas, an algorithm developed, etc. (again this depends on the type of research done). Detailed discussion of the results should be delayed to the next chapter.

Discussion This chapter should discuss in detail the significance of the major results – how they answer the research question, lead to acceptance/rejection of the hypothesis or achieve the aim of the research; whether there were any surprises or if they were in line with what was expected; etc.

Conclusion This chapter should revisit the problem, the major results and the discussion of them. It should discuss the contribution of the research to the research area in general and suggest what additional work could be done in the general area or specific extensions/improvements to the student's work.

I like to see a positive "take home message" in the last section of the chapter.

11.3 The Golden Thread

In my experience most students struggle with maintaining a clear and consistent theme (the "golden thread") throughout their documents. The golden thread should link the problem statement to the literature review; to the research question[s]; to the methodology; to the results and

discussion; and on to the conclusions. Students tend to write chapters and sections as if they are separate and unrelated blocks of text. This means that the reader sometimes does not know why they are reading some section and how what is covered there relates to the overall "story".

In addition, no reader (examiner!) is likely to read the whole thesis in one sitting so the golden thread shows them that the student has a good picture of their own research but will also remind them of what they have already read and let them know what is to come. This makes it much easier for them to digest the work.

As a supervisor it is one's role to help your students with this aspect of writing. This can be accomplished to some extent by requiring your students to have an introductory section and a concluding section in every chapter of their document.

The introductory section should

- Remind the reader of the broad story line (what is this research/thesis about?)
- Remind the reader of what was presented in previous chapters
- Explain how the current chapter fits into the overall story
- Tell the reader what material the current chapter is going to cover
- Tell the reader why this material is going to be covered
- Explain the structure of the current chapter

The concluding section should

- Remind the reader of what was covered in the chapter
- Explain why they should know this
- Tell them how the current chapter fits into the overall story
- Give them some idea of what will be covered in the next chapter and why this will be done

It is also important that what the student says in their introduction is consistent with what they say in their methodology chapter and that is also consistent with what appears in their conclusion.

11.4 Language editing

Very few students write well enough that their dissertation or thesis can be sent to external examiners without proofreading/grammar checking, etc. As a supervisor you may come across a few students who write well but, in general, you should recommend that your students get their work *language edited*. As a supervisor it is useful to keep a list of good language editors (or if you do not know of any to ask your more experienced colleagues for advice).

Unfortunately there are a lot of not very good language editors who advertise their services and are considerably cheaper than a good, registered language editor. The problem is that "you get what you pay for". Try to steer your students in the right direction.

11.5 In closing

Writing is difficult and students generally are not good at writing. In addition, students do not have an appreciation of how long it takes to get something into a decent form for their readers. As a supervisor, you need to be patient and supportive to get your students over this hurdle.

Chapter 12

Publishing with your postgraduate students

12.1 Is a publication required and is a publication enough?

Master's and PhD degrees are research degrees and it is thus a reasonable expectation by the university and the supervisor that conference or journal publications will be a by-product of completing the qualification. In addition, successful review in a competitive publication process (either for a conference or a journal) gives the student and the supervisor[s] confidence that the examiners who see the dissertation or thesis for the first time will not uncover unpleasant surprises.

Some universities specifically require students to (at least) submit papers to conferences or journals before they are allowed to submit their dissertations or theses. This is not always a requirement but is, in general, good practice. As the student works through the stages of the degree, the supervisor[s] and the student should be thinking about publication opportunities. I ask my Master's students to "promise" a conference publication before they submit their dissertation for examination. A Master's student should be able to write a conference paper once they have collected and analysed their data. For PhD students, I typically require at least a couple of conference papers (based on early stages of data collection and analysis) and a journal article (covering the complete project) before submission. I do not always get what I ask for but have to accept that.

It is a fact that many students do not publish from their degree work and still go on to get favourable reports from their examiners. In addition, supervisors and students should note that a publication does not guarantee that the dissertation or thesis will be accepted by the examiners. Journals and conferences can be quite "variable" in terms of the articles which they accept. This happens because reviewers have different standards and the reviewers that one paper gets allocated may be more (or less) demanding that those allocated to another paper. Journals are also not of the same standard – it is much easier to publish in some than in others. The student's examiners may expect more from the thesis than is expected by the reviewers for a journal publication. Also, how examiners interpret "must make a significant novel contribution in the field" can vary greatly between examiners. Some examiners would be happy with applying

existing theory/algorithms/appproaches in a new area while others would be looking for new developments.

Nonetheless, any postgraduate student (and the supervisor[s]) should be looking for opportunities to publish from their research.

12.2 Authorship

In any joint research it is important to have good ways of determining who gets to be listed as an author on a paper. This can differ between disciplines. In the student/supervisor relationship it is also very important to have "rules" for who is named on a paper. Some universities have guidelines for this. In other cases it is important to spell out your expectations early in the supervision process. In my supervisor agreement I spell out explicitly my expectations as regards co-authorship – "if the student publishes any paper on material which is related to their research topic then I would expect to be a co-author on such a publication". I also state explicitly how I will contribute to such papers.

12.3 Permission to publish

An issue related to authorship is when and where the student should be allowed to publish. There are two issues to consider. Is the paper of sufficient quality that you are prepared to have your name associated with it? What is the appropriate avenue for publication?

As an academic one does not want your student to submit a sub-standard paper to a journal or conference. This is bad for your personal reputation and for your institution's reputation. You would also not want your student to submit the paper to a low quality conference or a predatory journal. The last thing you want is your best results to be published somewhere that you would be embarrassed to cite.

For these reasons, it is important to be upfront about how possible publication should be handled. Make a point of being explicit about this in your supervisor agreement.

12.4 Dealing with "self plagiarism"

PhD candidates are expected/required to publish as part of their PhD. This means that the student is either writing a paper and then including that work in their thesis or they are writing the chapter[s] of the thesis and then extracting a paper from that material. This can lead to the issue of "self-plagiarism" being detected when a similarity check is done on the thesis prior to submission. Although the paper[s] and the relevant chapter[s] will to some extent be different because of the different format and purposes of the documents, there could still be quite a lot of similarity which could result in a high similarity score and could lead an examiner to question the student's work. If the examiner is really an expert in the field of the student's work then he/she may already know that the student had published his/her work.

From my experience as a PhD student, a supervisor and as an examiner, there are actions that should be taken by the student and the supervisor to avoid any possible complications.

It is probably more common that the student writes papers as they progress with their PhD work. The steps below assume this situation.

1. The paper should be run through iThenticate (or some similar tool) before submission to the journal/conference. If the report is satisfactory (decided on by student and co-authors which would normally include the supervisor[s]), this report should be filed. If the report is not satisfactory then rewriting will be required.

   Note: It is important to make sure that the tool being used to do this initial similarity check does not add the draft paper to its repository – this is the cause of many later problems. iThenticate does not add the paper to its repository which makes it a good option to use.

2. The student should make a significant effort to integrate the work in the paper into the flow of the thesis – the student should not simply cut-and-paste the paper into the thesis. This will somewhat reduce the similarity score that results when the completed thesis is compared with everything that is now in the public domain (which will include the student's papers).

3. There must be full disclosure in the thesis.

   The student should indicate in a preface to the thesis that publications have appeared as part of the PhD journey. The papers must be listed and the chapters in which that material appears should be stated.

   In the introduction to the relevant chapter[s] the student should remind the reader/examiner of the fact that some of the material presented in the chapter has been published.

   The iThenicate (or other tool) reports (see point 1), or parts thereof, can be added as appendices to the thesis.

4. The report from the similarity tool should be properly analysed.

   This should involve first looking at the raw score, then removing sources (e.g. the student's papers) appropriately, etc. The supervisor should discuss this process in his/her non-evaluative report. This report, or extracts of it, could also be included in the appendices of the thesis.

   There may be functions in the similarity tool that allow this to be done automatically but it can be done manually in most tools. It is fairly easy for the supervisor to handle this in TurnItIn.

Adherence to the steps above will make the examiner's task much easier.

In the situation where the student completes the thesis and then extracts a paper from a chapter (or chapters), the most important thing is that the paper should be carefully rewritten and tailored to the conference or journal. It should not look like a chapter extracted from a thesis. When the paper is submitted, the fact that the work has already been published as part of thesis should be made explicit.

12.5 In closing

Publishing with one's postgraduate students is desirable – it is good for both of you – but should be handled carefully. Make sure that the "rules" are clear to both parties before it becomes an issue.

Chapter 13

What to do when the student is ready to submit

13.1 Overview

It is quite exciting when a student who has been working well on their research and writing up gets close to the point where they are ready to submit their thesis or dissertation. It can also be somewhat fraught when a student, who you do not feel is ready to submit, decides that they want to or need to submit. In either case I make a point of reminding them about the examination process (see Section 13.2) and am explicit in pointing out to them anything that I see as a weakness in their thesis or dissertation (see Section 13.4). I believe that it is important to do this to ensure that the students know what is going to happen and also to protect oneself from recriminations if things do not go the way the student expects them to go.

13.2 Assessment of Master's and Doctoral Degrees

13.2.1 Examiners

Most South African universities use two examiners for a Master's dissertation and three examiners for a PhD thesis.

Some universities only use external examiners (i.e. not from the same university) but some will allow one internal examiner (someone from the same university or even from the same department) provided that the internal examiner has not been involved with or even exposed to the student's work.

For PhD theses, typically, at least one of the examiners must be "international" (i.e. not from South Africa).

The student's supervisor (or supervisors) is typically not one of the examiners but he/she is often asked to write a report on the supervision process.

In most cases, the examination process is purely based on an assessment of the quality of the work as reflected by the thesis or dissertation – there is no viva. Some universities may require candidates to give a presentation of their work before or during the examination process.

Some universities require the publication of at least one journal article as part of requirements for the awarding of a PhD degree.

13.2.2 Appointment of examiners

Formally the appointment of examiners is done by some authority in the school, college/faculty or institution. The supervisor is typically asked (required) to find/recommend/nominate people who are suitable and willing to examine the dissertation or thesis. These people may (or may not) be selected as the examiners.

I generally recommend examiners that I think will do a thorough job of assessing the student's work. I do not recommend "easy" examiners or people who think they owe me favours. One thing that is important to consider is the potential "match" between the examiners one recommends and the student. If the student is someone who has struggled to make progress with their research then I would not recommend the top person in the field as one of the student's examiners unless one knows that that person is able to see the work for what it is – an MSc or PhD and not research that someone is trying to publish in the top journal in the field. Such a person might be highly critical of a weak student's work and may even fail it. I would also not recommend someone who does not have solid experience in the field, backed up by decent publications, as they might miss flaws in the student's work. The combination of a top person who is highly critical and a person who is not really well grounded in the field of the student's research is bound to cause problems when the results come in.

Some institutions have rules in place that restrict who the supervisor can recommend. For example, one cannot recommend someone that you have published with recently. It is your responsibility as a supervisor to make sure that you know what the "local rules" are.

13.2.3 Instructions to examiners

Different universities have their own guidelines for examiners that are sent out with the dissertation or thesis that an academic is asked to examine. A generic version of these is given below but you can easily find your own institution's critera. These are things that you should bear in mind when one of your students is intent on completing and submitting their thesis or dissertation for examination.

Acquaintance with the Methods of Research Does the literature cited cover the most relevant sources, including both background and recent work?

Does the literature cited support the view that the problem being tackled is significant?

Is the broad problem area reduced to a testable hypothesis or focussed research question?

Is an appropriate experiment designed to test the hypothesis or answer the research question?

Are techniques for measurement, proving theorems, etc. suitable and thorough, and are the results well supported?

Is reporting of results clear (i.e. is it easy to see what is reported through clear captions, labels and explanations)?

Are the results of the experiment presented and discussed in relation to the hypothesis or research question?

Are comparisons reasonable (e.g. comparing like with like)?

Are the overall conclusions backed up by the results?

Is the significance of the conclusions supported (i.e., whether this is a useful result, applicable to other problems, etc.)?

Literary Style and Presentation Is the thesis or dissertation clearly written, with logical use of chapters, sections and subsections?

Are results presented in a way that they can easily be read and interpreted (e.g., so the significance can be seen easily, for example, using suitable graphs)?

Are the tables and figures clear and correctly captioned?

Is the language used in the document clear and correct?

Has the referencing of sources used in the research been handled in a clear, consistent and correct fashion?

13.2.4 Results

Typically examiners are asked to recommend one of the following:

1. Accepted unamended.
2. Accepted only after improvements (as specifically requested by the examiners) have been made to the satisfaction of the university.

   This option will typically be used where minor improvements are required (e.g. editorial improvements, corrections of citations and minor revisions of content).
3. Referred back for revision and resubmission for examination.

   This option will typically be used if the recommended changes require substantial revision of content and/or structure.
4. Rejected.

Very, very few of the theses or dissertations ever submitted fall into the first category. It does sometimes happen but because of the size of the document being produced small errors can creep in and these will need to be corrected.

Recommendations for improvements are relatively common. Different universities handle this in slightly different ways. Typically the student works with the supervisor to address the comments of the examiners and produces a revised thesis or dissertation and document detailing how the comments have been addressed. The supervisor is required to state explicitly that they

are satisfied with the changes. The changes then need to be approved through the university structures. Once this has been done the student's thesis or dissertation is "accepted".

Recommendation 3, unfortunately, does happen and can be devastating for a student. The student typically has to make big changes to their document and may even be required to do extra research. They are typically given somewhere between three months and a year to do these revisions. Then the revised document must be resubmitted for examination. The revisions would typically be re-examined by the same set of examiners.

Recommendation 4 is the "end of the line". The student gets no second chance and if they want to do the degree they would have to start from the beginning with a new topic.

13.3 The process

All universities have a process for dealing with the examination. As a supervisor you are involved in some parts of the process but in other parts can "only wait and see". Typically the process is something like

- The supervisor and student determine that the student is ready to submit. Alternatively the student decides that they are ready to submit and *pressurises* the supervisor to agree.
- The student submits the "intent to submit form".
- The "powers that be" request the supervisor to sign a form indicating that the student may submit.
- The supervisor signs the form. I typically email my students and warn them if I think there are "issues".
- The supervisor recommends examiners.
- Examiners are appointed.
- The student is given permission to submit.
- The student submits.
- The examination "package" is sent to the examiners.
- The supervisor is asked to submit a report.
- The reports of the examiners and the supervisor are collected together and a recommendation is made.
- The recommendation is approved and the result (or conditional result) is communicated to the student and the supervisor.
- If the result is "accept as is" then the next step is graduation.

- If the result is "imporvements" then the student makes corrections (guided by their supervisor), the supervisor signs off, the result is amended to pass and the next step is graduation.
- If the result is "revise and resubmit" then the student (working with their supervisor) is required to address the comments of the examiners and start the process again once they are done. This time around the supervisor does not need to recommend examiners as the same examiners are used.
- If the result is a "reject" then the student fails and the postgraduate office or some similar structure informs the student (and the supervisor[s]) of that fact.

13.4 My comments to my students

At some point, I am required to sign a document that says that I am prepared to allow the student to submit their thesis or dissertation. Normally I would only do so if I am relatively confident that the student will get an "improvements" recommendation. Sometimes, however, students feel that they are ready to submit and "pressurise" their supervisors to allow them to submit. This seems to be happening more frequently nowadays – students believe that they know "better" than their supervisor or are under some pressure to complete. If one of my students pressurises me and I do sign the form then I will explicitly tell the student what I think are still problems with their work.

At the point that I sign one of my students' *intention to submit forms* I typically remind them of the examination process and send them something like the message below:

```
My job as a supervisor is to try to advise you and guide you so that you end
up (hopefully) in category 2 and failing that in category 3.

I do not, however, have much control over the process.

You make the final decision about whether or not you are going to submit. You make
(and have already made) decisions about which of my advice to use, which to use
partially and which to ignore.  The amount of effort and care that you have put
into the work and the document is also your responsibility.

I also do not have any influence with the examiners. They are appointed and they
apply their minds to your work and make recommendations.

In my opinion there are still some areas of your work where the examiners could
criticise you. The most significant of these are:
1. I am concerned as to whether the examiners will agree that you have made "a
    significant and original academic contribution at the frontiers of a
    discipline or field".
```

2. ....
3. ....

There are also other smaller issues that the examiners may feel are significant.

Having said the above, I feel that there is a reasonable chance (but obviously no guarantee) that you will achieve "accepted only after improvements" and failing that "referred back for revision and resubmission for examination" which is why I have allowed you to submit at this time.

Please acknowledge that you have received this email from me.

I wish you good luck in the examination process.

13.5 The waiting game

Sometimes the examination process can take a long time. Students get "twitchy" and want to know why. My typical response is something like...

I have not yet heard anything about the thesis. There could be a number of reasons for this

1. One or more slow examiners.
2. There are significant disagreements between the recommendations made by examiners, or
3. One or more examiners have recommended something more demanding than just improvements (i.e. revise and resubmit, or fail).

2 and 3 require the non-examining chair to write a report to our college and then they have to make a recommendation to the College of Graduate Studies who will then notify you. That takes time.

We just have to wait.

13.6 In closing

When a student submits it can be exciting (if one is reasonably positive of a good result) and is almost always stressful. All one can do is wait and see. Hopefully it all works out well. If it doesn't work out well, then more often than not it is a case of a student who applied pressure to be allowed to submit when they were not ready to do so. It is an *understandable* "failing" of a supervisor to allow oneself to be pressurised into allowing a student to submit. We could,

however, be better supported by our institutions by them more easily allowing "submission without the supervisor's *acquiessence*" while still acknowledging that the supervisor might have made significant investments in trying to get the student to prepare an acceptable thesis or dissertation.

Chapter 14

What happens when the student gets their results

14.1 Reminder

A student could get one of four results listed below for their thesis or dissertation.

1. Accepted unamended.
2. Accepted only after improvements.
3. Referred back for revision and resubmission for examination.
4. Rejected.

Obviously as a student and supervisor result number 1 is the best possible situation and you can both relax and wait for the graduation.

Result 4 is an extremely unlikely result if the supervisor has tried to fulfil their role and the student has put in some effort but it does happen. It means that there is essentially nothing that you or the student can do. This is the end of the road.

What to do as a supervisor if the result for your student is 2 or 3 is discussed in Sections 14.2 and 14.3 below.

14.2 Improvements

The improvements required by the examiners can range from the correction of a few typographical, grammatical or presentation issues to a much larger collection of typographical, grammatical, presentation and even content issues. It is the supervisor's responsibility to see that the student makes the required corrections or in some cases argues why the requested "correction" does not make sense.

The best way to do this is to get the student to draw up a table of the required corrections (see Table 14.1). Once you are satisfied with the table then you can get the student to address each issue and complete the table as they do so. Once the table is complete and you have checked the

Examiner	Requested correction	How this was addressed

Table 14.1: Suggested format for a table of required corrections to a thesis or dissertation

corrections then you can follow your institution's "sign off" procedure and the student's result will be amended to "accepted". The next step is graduation.

14.3 Revise and resubmit

This result is quite a bit harder to deal with as the examiners often have contradictory suggestions/requirements as to how the thesis or dissertation should (or could) be revised. It is, however, useful as a starting point to get the student to prepare a document that lists the examiners' suggestions/requirements on substantive issues and then tries to find common ground as this will hopefully give an idea on what to focus on in the revision process. Note that sometimes (for example, Unisa) institutional policy requires the supervisor and the non-examining chair of the examination committee to make the first pass at this summary document.

Once the student and the supervisor agree on what revisions are feasible then the student should document this, prepare a change log and then start working on the revision.

14.4 Finalising the process

Once the student's result has become an "accept" there could still be university specific requirements that have to be satisfied before the student can finally graduate. One of these is the typically the submission of the "final" approved thesis or dissertation into the university's institutional respository (or some other respository). Normally you are told how to do this and you just follow the instructions that you are given.

14.5 An aside

As a supervisor it is sometimes necessary to have a "thick skin" especially when dealing with the reports from examiners on a student who pressurised you into allowing them to submit. The examiners do not know the background and could say things like "it seems like the supervisor did not bother to check X " when X is something you have tried very hard to get the student to fix. It is not the sort of personalisation an examiner should make but they are human too.

14.6 In closing

A good result is exciting for the student and the supervisor. A poor result can be somewhat depressing. What is important is that you, as the supervisor, have done the best you can and

will continue to do so until the student has passed (or gone away).

Chapter 15

Examining dissertations and theses

15.1 Introduction

As an academic is it expected that one is involved in supervison of postgraduate students. This means that once a student completes their research then one needs to "impose" on one of one's academic colleagues to act as an examiner for one's student. Examiners generally do not examine in order to get paid for doing so but do so in a sense of *quid pro quo*. As a supervisor it is incumbent on one to also be an examiner to maintain status quo in the system.

Acting as an examiner is also a very good way of understanding what is required for a Master's degree or a PhD. Institutions may have different ways of phrasing the requirements but the overall standard expected is quite similar. If one examines dissertations and/or theses then one gets to know the overall standard required for these qualifications. This puts one in a much better position to advise one's students.

15.2 The examination process

The process normally starts with the supervisor asking you if you would be willing to examine their student's dissertation or thesis. In some instances, if you accept the invitation it means that you are highly likely to be appointed as an examiner and at some point you will get a more formal invitation from the faculty/college where the student is registered. In other cases (for example, Unisa) accepting this invitation means that the supervisor recommends you as an examiner to their departmental/school/faculty structures and someone in authority decides whether to appoint you. If you are appointed, you may be formally invited. If you are not appointed, you may be notified (but more likely will not be).

In most instances the next thing that happens is that you get a package containing the document to be examined and the various documents required for the process. Sometimes the "package" is in electronic format as an email plus attachments or as an invitation to Google Drive or equivalent. Some institutions will require you to acknowledge receipt of the documents. Others will not. Some institutions will monitor your progress, others will ignore you.

Typically you are given around 6 weeks to do the examination (sometimes 4 and sometimes 8 but 6 is common). Some institutions will remind you as the deadline approaches. Others will

not.

Once you have completed the examination, you typically need to

- Write an examiner's report – most institutions will give you some idea of the form of the report.
- Complete a Recommendation/Result form. Typically the recommendations are some variant of
  1. Accept as is.
  2. Accept provided minor changes are made to the satisfaction of some authority (the supervisor, the head of school, someone in the faculty or college, etc.).
  3. Revise and resubmit. This recommendation is made when there are major problems with the document but the examiner thinks that the research/document can be salvaged.
  4. Fail.
- Submit various documents. Typically these are
  - The recomendation/result form
  - The examiner's report
  - A claim form
  - A copy (sometimes certified) of your ID
  - A copy of your highest qualification (sometimes all qualifications) – sometimes these need to be certified.
  - Proof of banking details.
- Wait until you get told that the institution has received the documents – this may never happen.
- Wait until you get paid – mostly this does happen.
- Wait to hear the overall result of the examination process. Some institutions inform you of the result. Some do not (and some of these tell you in advance that they will not inform you).

15.3 Examining a dissertation or thesis

Basically your task as an examiner is to read the thesis or dissertation and decide whether it is acceptable. This is a fairly daunting task especially the first time round. It helps to have examined Honours research reports before examining an MSc and one should definitely have examined a few MScs before tackling a PhD. It also helps to have read a number of dissertations and theses before taking on the task of examining one.

Most institutions give some guidelines as to what is expected from an MSc or PhD. These are normally part of the package one receives as an examiner. One can also consult one's own institution's policies/procedures to see what the requirements for the different degrees are. I think these guidelines do help but experience still counts for a lot.

There are different ways of reading the document. I tend to read from the beginning to the end and make notes about things as I go along. For example, "abstract say RQ is.. and methodology is..". Using my notes, I look for the golden thread as I go along. I also "mark up" the document where I find errors, lack of clarity, ambiguities, etc. Once I have read the complete document, I use my notes and annotations to develop my report. A colleague says that she reads the abstract, introductory chapter and the concluding chapter first. This should give her a good overview of the work. Then she reads the introductory and concluding sections for each chapter. This starts adding to the detail. Only later does she read all the sections in the document. As an examiner, you will have to develop your own "style".

15.4 In closing

Supervising and examining are two sides of the same coin. One needs to do both in order to do both well. Neither is easy but one gets better at both with practice.

Chapter 16

Maintaining an academic presence

16.1 Introduction

As a supervisor, you will only attract students if they know about you. As a potential examiner of postgraduate students, you will only be asked to examine dissertations and theses if other supervisors know you or if they can relatively easily find out information about you. It is thus important to make sure that students and other supervisors know what your interests are and what your "track record" is. This means that you need to be "searchable" on the web and what is on the web needs to be "current". I have had some frustrating experiences where I know of someone who works in a given area and is based at some institution but I cannot find up to date information about the person on their institution's website or find a personal website for them. If that happens, I just move on to the next person on my list of "possibles".

Most institutions have departmental or school webpages where some information can be posted. Unfortunately these webpages are often not under the individual's control and so there is a limit to what can be posted and restrictions about the form in which it can be posted. In order to attract students you need to be posting information about past students, current students, research publications, and ongoing projects. To make another supervisor's task of selecting and recommending you as a potential examiner for one of their students you need to post the same information but in addition you need to give some details of what examining you have done in the past. This is not always easy to do in a standard institutional template.

I make a point of maintaining an up to date online CV and an electronic version of that CV that I can easily print or email to anyone who asks for it. See some comments about these in Sections 16.2 and 16.3 below.

16.2 Online curriculum vitæ

There are obviously lots of ways to have an online CV. Some institutions will host these for their academics, some are much less willing to do so. One could purchase one's own site. I have found that Google Sites works quite well for me and it is relatively easy to maintain and publish the pages.

See `https://sites.google.com/site/iansandersacademiccv/home`

There are also sites like ResearchGate, Academia.edu, LinkedIn, etc. that allow one to have an online presence. These do not suit my requirements.

In my opinion it makes sense to create a Google Scholar profile. It makes keeping track of citations etc. much easier and is easily searchable. A word of advice, if you create such a profile then make sure you make the `Homepage` link point to something that provides information about you. I have set mine up to point to my online CV.

It is also worthwhile creating ORCID, ResearcherID and Scopus profiles.

16.3 Printable version of curriculum vitæ

I use LaTeX to maintain a printable/emailable version of my CV. The layout that I use for this has evolved over the years and it seems to work for me. Appendix B gives my idea of the basic structure for an acceptable academic cv.

16.4 In closing

As an academic, it is important to be "visible". It takes time and effort but if you get into a good routine it does not take that much effort to keep up to date once everything is in place. I make a point of updating my online and print CVs anytime something changes (a publication, a student completes, etc.). I believe that it is very important to do so.

Chapter 17

Resources and useful links

17.1 Research articles

The role of the supervisor Lee (2007), Abiddin et al. (2009), Grant et al. (2014) and Bøgelund (2015).

Co-supervision Grossman and Crowther (2015)

Research methodology for the computing disciplines Pilkington and Pretorius (2015)

17.2 Books

- Justin Zobel's book *Writing for Computer Science* (Zobel, 2014)
- Martin Olivier's book *Information Technology Research – A Practical Guide for Computer Science and Informatics* (Olivier, 2009)
- Neal Stewart Jr's book *Research Ethics for Scientists: A Companion for Students* (Stewart, 2011)
- Hannah Farrimind's book *Doing ethical research* (Farrimond, 2013)

17.3 Other material

- The good supervision guide by Alexandra Bulat Bulat (2019)

17.4 Websites

- My Google site for postgraduate students – `https://sites.google.com/site/postgraduatestudentresources/home`
- The ACM digital library – `https://dl.acm.org`

- The Top 7 Statistical Tools You Need to Make Your Data Shine – https://imotions.com/blog/statistical-tools/
- Plagiarism.org https://www.plagiarism.org/article/what-is-plagiarism
- ThoughtCo. https://www.thoughtco.com/plagiarism-definition-1691631
- City University of Hong Kong research ethics webpage https://libguides.library.cityu.edu.hk/researchmethods/ethics

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Appendix A

An example of a supervision agreement

The supervision agreement shown overleaf contains a lot of information that is specific to Unisa but this could be modified to fit another institution's polices and procedures.

The LaTeX source for the agreement can be obtained by emailing `sandeid@unisa.ac.za`.

Supervision Agreement
Doctoral Research

Agreement between
Supervisor
&
Student Name (Student number)

Date of agreement

1 Premable

This document serves as the basis for an agreement between myself and my postgraduate students. It describes how I see the supervision process in the context of the Unisa standard procedures as well as my own experience and viewpoints.

2 Standard Procedures

4. ROLE OF SUPERVISOR

4.1 The supervisor and the student should agree on appropriate deadlines and timetables and the supervisor must return work submitted by the student timeously.

4.2 The supervisor must provide appropriate guidance by alerting the student to helpful articles, books and conferences as well as guidance in the compilation (and planning) of a thesis. However, it remains the student's responsibility to conduct independent research.

4.3 It should be pointed out to the student that it is his/her duty, and not that of the supervisor, to trace sources.

4.4 The supervisor merely has to verify the sources in broad outline.

4.5 The supervisor should draw the student's attention to linguistic errors, inadequately substantiated or poorly formulated statements, but the student should be left to improve these himself/herself.

4.6 The supervisor must treat the student with courtesy and fairness and should suggest appropriate developmental goals and assistance towards those goals by directing the student to workshops/lectures designed for this purpose.

4.7 On no account should the supervisor rewrite parts of the student's work. He/she should merely point out deficiencies to the student.

4.8 The student should be given comments on his/her technical presentation and methodology.

4.9 Before the thesis is presented for examination the manuscript must be submitted to the supervisor in its final form. The supervisor should ensure that it contains the prescribed summary and keywords.

4.10 A thesis may not be submitted for examination without the supervisor's consent. (This rule may be waived only by Senate.) Such consent does not, however, imply acceptance of the thesis.

4.11 The supervisor should be mindful of the relevant rules.

4.12 The supervisor and co-supervisor must liaise regularly about the student's work.

4.13 If formal doctoral examinations are to be conducted or a formal study programme is prescribed, the supervisor (with the assistance of colleagues if there are subsidiary subjects) has to see to the compilation of a reading list for the student. If a doctoral defence (viva voce) is a condition of the College/School or Department, it is the supervisor's task to assist the student in preparing for this oral defence.

4.14 The supervisor has to advise the student on the academic standard of the thesis.

4.15 If the thesis entails statistical processing, an expert should be consulted in advance.

4.16 The supervisor must monitor the student's progress and make a recommendation to the Chairperson of the Department concerning re-registration (or refusal thereof)

4.17 It is the responsibility of the supervisor to include information on the progress of Master and Doctoral students on myUnisa/Student System.

3 My role as the supervisor

- I will guide the candidate through the completion of her/his thesis. In particular I will
  - recommend publications and provide or suggest some sources for literature studies,
  - advise the student on techniques for sourcing publications and recommend them to use the SoC postgrad portal, as well as referring them to the CSET subject librarian,
  - guide the student in selecting a suitable research topic which will satisfy the requirement of their work making a significant contribution to knowledge in the area of study,
  - guide the student in selecting an appropriate research design and methodology, referring them to literature on research design and showing examples of other studies, where appropriate,
  - advise the student in terms of performing the research – i.e. collecting and analysing the data, and
  - advise the student on the writing up of the final document.
- I will do this in an ethical and informed manner.

- I will treat the candidate with respect.
- I will adhere to the standard procedures (see Section 2) where appropriate.
- I will adhere to the additional responsibilities as listed.

4 Additional responsibilities

- I will attempt to give the student an enriching and enabling supervision experience.

5 Supervisor's expectations of the candidate

- I expect the student to be aware of and to understand all of Unisa's policies concerning postgraduate studies; ethics clearance; permission to do research on Unisa staff, students and data; etc.
- I expect the candidate to approach his/her studies with commitment and diligence. He/she must show initiative and be able to work independently, though under my guidance.
- I expect rigour in the planning, management, and implementation of the research process. This includes:
  - broad and deep literature studies in the focus area/s, so as to become an expert in his/her own right in the domain of the research;
  - meticulous storage of data for 5 years; electronic backups of all documents – of all stages – of the research;
  - honest and ethical procedures in citations and use of publications;
  - avoidance of plagiarism;
  - adherence to Unisa's ethics policy. This involves submitting an application to the ethics committee of the School of Computing and requesting permission to do research on Unisa staff, students or data if this is appropriate for the candidate's research.
- I expect the student to produce *at least one* accredited journal publication (or at least two subsidy bearing peer reviewed conference proceedings publications) during the course of his/her Doctoral degree and expect to appear as a co-author on such publication[s].

  In fact, if the student publishes any paper on material which is related to their research topic then I would expect to be a co-author on such a publication. I will contribute to any such publication in terms of intellectual input, academic and technical advice, editing, proof reading, etc.

  At the completion of the degree, I hope that the student would continue to be involved in the research area covered by the Doctoral degree. If this is the case then I would like to continue to be involved in the research. If the student decides not to continue with the work then I would like him/her to hand over the project (plus all data, files, notes, etc.) to me so that I can continue the work on my own or with other students. In either case, if subsequent publications ensue then appropriate accreditation of input/effort will be made.

- I expect the student to meticulously re-read, check, and reflect on drafts of chapters sent to the supervisor. This should be done with a view to self-evaluation of the text and self-correction. The process may (depending on the language skills of the candidate) require that the document is sent for language editing or at least sent to an English first language speaker for informal editing. Should the supervisor identify a disproportionate number of obvious mistakes, technical errors, repetition of content, etc., the submission will be returned to the student for corrections and re-submission prior to evaluation by the supervisor and provision of feedback.

  In normal circumstances the supervisor will commit to giving feedback on a chapter or other significant piece of work within 15 working days.

  When the document submitted is the entire thesis, more time will be required and the student will be informed of the date by which he/she could expect feedback. In all likelihood, the document will be returned in sections, although the supervisor reserves the right, in the light of reading subsequent chapters, to advise further modifications on section/s already returned.

- I expect the student to keep their literature review chapters current during the course of their studies. This should be done by continually following the literature in the area of their research. The final dissertation should include citations that are current at the time of submission.

- I expect the student to do all of the document preparation for their thesis and related work using the LaTeX document preparation system.

6 The supervision process

- Communication

  The prime means of communication will be via e-mail (for queries, responses, progress reports and updates). I undertake, under normal circumstances, to respond to e-mail queries within 48 hours. When I am not available for prompt responses (e.g. out-of-office or engaged in intensive work situations) students will be informed.

  Face-to-face meetings should be arranged for at least once every year. It is the student's responsibility to make sure that this happens. The student can apply for a Unisa bursary to make this possible.

  Once the student gets close to the completion stage, two face-to-face meetings in the last six months before the final draft is submitted to the supervisor should be attempted.

- Plans and schedules

  The proposal document included a detailed description of the envisaged work, research design and methods, and projected time line. That said, it is acknowledged that personal and work situations change, and the supervisor will be flexible in cases where extra time is needed for a valid reason. Many Unisa students are successful professionals, employed in demanding, time-intensive careers, and this must be taken into account.

  It is the student's responsibility to provide the supervisor[s] with an updated research plan at the beginning of every academic year. It is also the student's responsibility to inform the supervisor of any changes to the plan during the course of the year.

The amount of work to be done in a year varies from one candidate to another. It is the student's responsibility to communicate with the supervisor[s] regarding their work commitments/obligations and other commitments during the year.

- Final write up.

  Technical finalisation of a thesis can take up to 3 months, including:

  - professional language editing;
  - cross-checking, consistency checking and meticulous attention to technical aspects by the student;
  - final attention to citations and referencing by the student; and
  - a final overview by the supervisor, which may involve a requirement for further refinements.

7 Support

1. Typically I cannot supply financial support to any student.
2. I will advise students on training courses etc. but it is up to the student to make their own arrangements to attend such courses.

8 My role in the examination process

Please note according to the assessment policy your Doctoral thesis will be assessed as below.

7.40 Examiners may compile their reports as they see fit, but their reports should include comments on the following, taking into account the requirements of the HEQSF set out in par. 5.49 above:

a Scientific and academic standard of research

i research procedures and techniques;
ii methodology;
iii demarcation and scope of research;
iv theoretical substantiation;
v exploration of the literature;
vi grasp of the field of research;
vii footnotes and bibliography

b Scientific and academic quality of processing and presentation

i Processing;
ii presentation and analysis of data;
iii structure and logical development/arrangement of content (internal coherence and classification);
iv critical findings; and

v recommendations

c Language and editing

d Technical presentation and layout

e Examiners should also indicate whether they regard parts and/or the substance of the dissertation/thesis as publishable

A Doctoral thesis must demonstrate high level research capability and make a significant and original academic contribution at the frontiers of a discipline or field. The work must be of a quality to satisfy peer review and merit publication.

7.41 Examiners should clearly indicate on the result form whether the dissertation or thesis is:

1. Accepted unamended.
2. Accepted only after improvements (as specifically requested) have been made to the satisfaction of the supervisor in the additional copies. For this recommendation to be made, it should be possible to attend to the required improvements within two months after release of the result. This option will typically be used where minor improvements are required (e.g. editorial improvements, corrections of citations and minor revisions of content).
3. Referred back for revision and resubmission for examination. This option should be used if the recommended changes require substantial revision of content and/or structure.
4. Rejected.

Very, very few of the doctoral degrees ever submitted fall into the first category.

My job as a supervisor is to advise and guide you so that your result ends up (hopefully) in category 2 and failing that in category 3.

I do not, however, have much control over the process.

You make the final decision about whether or not you are going to submit. You make decisions about which of my advice to use, which to use partially and which to ignore. The amount of effort and care that you have put into the work and the document is also your responsibility.

I also do not have any influence with the examiners. They are appointed and they apply their minds to your work and make recommendations.

9 Acceptance

The agreement above is accepted by the supervisor, *supervisor's name*, and the student *student's name*.

Both parties to sign and date.

Appendix B

The skeleton of an academic curriculum vitæ

Included overleaf is an example of an academic CV. Obviously this can be tailored to your own needs.

The LaTeX source for the CV can be obtained from the author by emailing `sandeid@unisa.ac.za`

Curriculum Vitæ– Name and surname

as at day, month, year

1 Personal Details

Surname	
First Names	
Date of Birth	
Place of Birth	
Marital Status	
Residential Address	
Postal Address	
Telephone Numbers	
Email Address	
Current Employer	
Department	
Current Position	
ORCID ID	

2 Academic Qualifications

years	qualification
another year	another qualification

3 Previous Employment

years	job title
another year	another job

4 Membership of Professional Bodies/Associations

1.

5 Teaching

Enter details of courses taught in the past and currently being taught...
Also any other teaching related information

6 Supervision of Higher Degrees

6.1 Completed

MSc 1. Joe Bloggs

PhD 1. Jane Doe

6.2 In progress

MSc 1.

PhD 1.

6.3 Supervisory panels

If this is appropriate it can be listed here.

6.4 Honours students

1. student 1
2. student 2
3. etc..

6.5 Examining

MSc 1.

PhD 1.

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